# 1R - 428 - 58

# CLOSURE REPORT

# DATE: JAN 17, 2008



#### RECEIVED

JAN 2 2 2008 Environmental Bureau Oil Conservation Division



# F-33 Vent, NMOCD Case #1R0428-58

# Rice Operating Company Closure Report

# **R.T. Hicks Consultants, Ltd.**

901 Rio Grande Blvd. NW, Suite F-142 Albuquerque, NM 87104

901 Rio Grande Blvd NW 🛦 Suite F-142 🛦 Albuquerque, NM 87104 🛦 505.266.5004 🛦 Fax: 505.266-0745

January 17, 2008

RECEIVED

Mr. Ed Hansen New Mexico Oil Conservation Division 1220 South St. Francis Drive Santa Fe, New Mexico 87505

JAN 2 2 2008 Environmental Bureau Oil Conservation Division

RE: NMOCD Case # 1R0428-58, F-33 Vent Hobbs SWD System Abandonment Closure Report

Dear Mr. Hansen:

This letter and Appendices are the final Closure Report for the F-33 Vent site. The NMOCD approved Corrective Action Plan (Section 6.0, pages 11-12) proposed remedy included excavation of soils in the upper vadose zone to the dimensions of  $10 \times 10 \times 12$  feet deep, installation of a clay layer, native soil was mixed with clean, imported soil, as shown in Figure 1, below. The surface was re-seeded on August 29<sup>th</sup>, 2007 with native grass seed, creating an infiltration barrier by re-vegetation of the ground surface.



#### Figure 1. Schematic diagram of ET Infiltration Barrier

Appendix A includes the junction box closure form as well as the clay density test, disposal manifest for the 18 ft<sup>3</sup> of off-hauled soil, laboratory results and PID measurements on backfill, and photographs documenting work at the site. Appendix B includes copies of previous submissions and the NMOCD approval email.

January 17, 2008 Page 2

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We respectfully request NMOCD approve site closure in writing. Thank you for your attention to this matter.

Sincerely, R.T. Hicks Consultants, Ltd.

Katie Lee

Katie Lee Staff Scientist

Copy: Rice Operating Company Hobbs NMOCD Office



#### RICE OPERATING COMPANY JUNCTION BOX FINAL REPORT

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Date Started	5/22/2	006	Date Co	npleted	8/29/2007		D Witness		no
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Soil Disposed	18	cubic yai	rds Of	fsite Facility	Sund	lance	Location	Eunice,	New Mexic
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То:	Rice Operating Attn: Hack Conder 122 W. Taylor		Material:	Red Clay (Wallach)	
Project:	Hobbs, NM 88240 General Information Project No. 2007.100	7	Test Method:	ASTM: D 2922	
Date of Test:	August 29, 2007		Depth:	4' Below Finished Sul	bgrade
			Depth of Probe:	10"	
Test No.		Location	Dry Density % Maximum	% Moisture	Depth
26.9		HODDS F-33 Vent	95.0	10.7	
Control Density:	104.4 ASTM: D 698		Optimum Moistu	r <b>e:</b> 20.3%	
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PHONE (325) 673-7001 · 2111 BEECHWOOD · ABILENE, TX 79603

PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR RICE OPERATING ATTN: KRISTIN FARRIS-POPE 122 W. TAYLOR HOBBS, NM 88240 FAX TO: (505) 397-1471

Receiving Date: 08/30/07 Reporting Date: 08/30/07 Project Owner: NOT GIVEN Project Name: HOBBS F-33 VENT Project Location: HOBBS F-33 VENT Analysis Date: 08/30/07 Sampling Date: 08/29/07 Sample Type: SOIL Sample Condition: COOL & INTACT Sample Received By: CK Analyzed By: HM

LAB	NO.	SAMPLE ID	

CI (mg/Kg)

H13198-1 21 MIXED BACKELLI COMPOSITE	128
THOTSO'T Z. TMIXED DACKTILE COMPOSITE	120
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* •	
Quality Control	480
True Value QC	500
% Recovery	96
Relative Percent Difference	2.1

METHOD: Standard Methods4500-CI'BNote: Analysis performed on a 1:4 w:v aqueous extract.

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H13198 RICE

08-31-0 Date

PLEASE NOTE: Liability and Damages. Cardinal's lability and client's exclusive remedy for any claim ansing, whether based in contract or tort, shall be limited to the amount paid by client for analyses. All claims, including those for negligence and any other cause whatoever shall be deemed waived unless made in writing and received by Cardinal within thiny (30) days after completion of the applicable service. In no event shall Cardinal be liable for incidental or consequential damages, including, without limitation, business interruptions, loss of use, or loss of profits incurred by client, its subsidiaries, affiliates or successors arising out of or related to the performance of services hereunder by Cardinal, regardless of whether such claim is based upon any of the above-stated reasons or otherwise.

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† Cardinal cannot accept verbal changes. Please fax written changes to 505-393-2476

## **RICE OPERATING COMPANY**

122 West Taylor, Hobbs, NM 88240 Phone: (505) 393-9174 Fax: (505) 397-1471

#### **VOC FIELD TEST REPORT FORM**

PID METER READING AND CALIBRATION

CHECK		MODEL: PGM 761S	SERIAL NO.: 104412
MODEL	×	MODEL: PGM 7600	SERIAL NO.: 110-013744
NUMBER		MODEL: PGM 7600	SERIAL NO.: 110-12383
		MODEL: PGM 7600	SERIAL NO.: 110-012920
LOT NO .:		07-3264	GAS COMPOSITION: ISOBUTYLENE 100PPM / AIR: BALANCE
FILL DATE:		8/17/2007	EXPIRATION DATE: 2/17/2009

ACCURACY +/- 2%

METER READING ACCURACY: 102 ppm

SYSTEM	JUNCTION	UNIT	SECTION	TOWNSHIP	RANGE
Hobbs	F-33 vent	F	33	18S	38E

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SAMPLE	PID READING	SAMPLE	PID READING
2:1 mixed backfill comp.			
pile #1	28.1		
2:1 mixed backfill comp.			
pile #2	49.7 <sup>-</sup>		
			·

I verify that I have calibrated the above instrument in accordance to the manufacturers operation manual.

SIGNATURE:

Lara Weinheimer

DATE: 8/29/2007



Hobbs F-33 vent Excavating 10' x 10' x 12' hole



Hobbs F-33 vent Laying Clay Layer @ 4'



Hobbs F-33 vent Compaction Layer Test



Hobbs F-33 vent Seeding disturbed area



#### Katie Lee

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記録

 From:
 Kristin Pope [kpope@riceswd.com]

 Sent:
 Wednesday, October 31, 2007 3:30 PM

 To:
 Katie Lee

 Subject:
 Fw: Summary of July 18 meeting

From: Hansen, Edward J., EMNRD To: Kristin Pope Cc: Carolyn Haynes ; Scott Curtis ; Sanchez, Daniel J., EMNRD ; Price, Wayne, EMNRD Sent: Wednesday, August 08, 2007 11:26 AM Subject: RE: Summary of July 18 meeting

Kristin,

Your summary appears to be accurate and complete. Attached is the summary that you sent with comments from me [OCD case #s and formal (email) approval dates]. I'll be sending more formal (via email) approvals for the closures and some of the CAPs soon. Also, I will review and comment on the other CAPs and the APs a.s.a.p.

Thanks for the summary. Let me know if you have any questions regarding my comments.

Edward J. Hansen Hydrologist Environmental Bureau 505-476-3489

From: Kristin Pope [mailto:kpope@riceswd.com]
Sent: Wednesday, August 08, 2007 10:34 AM
To: Sanchez, Daniel J., EMNRD; Price, Wayne, EMNRD; Hansen, Edward J., EMNRD
Cc: Carolyn Haynes; Scott Curtis
Subject: Summary of July 18 meeting

Gentlemen,

Please review the attached summary of our July 18 meeting. Please let me know if anything needs to be changed. OCD and ROC have already moved forward with several of the projects listed but I would like written confirmation for our files. Thanks again for your time.

Kristin Farris Pope Project Scientist RICE Operating Company Hobbs, New Mexico (505) 393-9174

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### OCD/ROC MEETING SUMMARY July 18, 2007

#### CLOSURES

- Abatement Completion Report for <u>BD Zachary Hinton EOL</u> submitted by R.T. Hicks Consultants on 3/15/2007. AP-50
- Abatement Completion Report for <u>EME Marathon Barber (jct. E-5)</u> submitted by R.T. Hicks Consultants on 5/16/2007. 1R0427-91 *Approved soil work completed Dec. 2006*
- 3. Closure Report for <u>Hobbs I-29 EOL boot</u> submitted by R.T. Hicks Consultants on 5/23/2007. Approved soil work completed in 2006. 1R428-42
- 4. Closure Request for <u>BD jct. N-29</u> submitted by R.T. Hicks Consultants on 2/10/2007. #1R0426-37

#### APPROVALS

Sugar Sector

- Stage 1&2 Abatement Plan for <u>Vacuum F/G-35 SWD</u> submitted by R.T. Hicks Consultants; proof of public notice submitted Feb. 2006; AP-59 *Vadose zone remedy complete; reclaiming surface; groundwater treatment ongoing at F-35; evaluating treatment potential at G-35*
- 2. INVESTIGATION & CHARACTERIZATION PLANS (ICP) NMOCD Approved (1 – 14) via email August 6, 2007
  - 1. Hobbs O-5 Historical Release by Hicks on 4/11/2007 #1R428-69
  - 2. <u>EME State 'H' EOL</u> by P. Galusky on 5/1/2007 #1R427-15
  - 3. Justis E-1 vent by Highlander on 11/29/2006. #1R0432-06
  - 4. Vacuum State 'P' EOL by Galusky on 4/20/07 #1R425-26
  - 5. <u>Vacuum jct. F-31-1</u> by Hicks on 4/17/07. #1R425-27
  - 6. <u>BD P-26-1 vent</u> by Trident on 2/12/2007. #1R0426-106
  - 7. <u>BD jct. P-26-2</u> by Trident on 2/12/2007. #1R0426-107
  - 8. <u>Hobbs jct. E-4, M-4 vent, & N-4 vent</u> (1 plan) by Hicks on 4/17/07 #1R428-71, #1R428-76, #1R428-68, respectively
  - 9. <u>EME L-6 boot</u> by Trident on 12/1/2006. #1R0427-09
  - 10. EME B-8 leak by Trident on 12/1/2006. #1R0480
  - 11. <u>EME jct. F-18</u> by Arcadis on 7/6/2007 #1R427-16
  - 12. <u>BD jct. F-25-1</u> by Arcadis on 7/12/2007 #1R426-10
  - 13. <u>EME L-15-1 vent</u> by Galusky on 7/16/2007 #1R427-173
  - 14. EME State 'Q' EOL boot by Galusky on 7/16/2007 #1R427-174
- Corrective Action Plan (CAP) for <u>Hobbs E-15 SWD</u> submitted on 11/28/2006 by Arcadis G&M. *Approved with clay or GCL condition* #1R428-40 NMOCD Approved with conditions via email July 27. 2007

- 4. CAP for <u>Hobbs F-29-1b boot</u> submitted by R.T. Hicks Consultants on 4/2/2007. #1R428-45
- 5. CAP for <u>Hobbs O-29 vent</u> submitted by R.T. Hicks Consultants on 4/2/2007. #1R428-43
- 6. CAP for <u>Hobbs I-29 vent</u> submitted by R.T. Hicks Consultants on 4/13/2007. #1R428-41
- 7. CAP for <u>Hobbs jct. E-33-1</u> submitted by R.T. Hicks Consultants on 1/2/2007. #1R428-67
- 8. CAP for <u>Hobbs B-32 boot</u> submitted by R.T. Hicks Consultants on 1/22/2007. #1R428-57
- 9. CAP for <u>Hobbs jct. E-32-1</u> submitted by R.T. Hicks Consultants on 1/22/2007. #1R428-65
- CAP for <u>Hobbs F-33 vent</u> submitted by R.T. Hicks Consultants on 1/22/2007. #1R428-58
- 11. CAP for <u>EME A-2 leak</u> submitted by Highlander on 5/23/2007. # 1R0427-62 *condition: install clay at 4 ft instead of 3 ft as proposed*
- 12. CAP for jct. A-2-1 submitted by Highlander on 5/23/2007. # 1R0427-177 *condition: install clay at 4 ft instead of 3 ft as proposed*
- 13. CAP for <u>EME I-1 off-site encroachment</u> submitted by Trident on 2/27/07. #1R0464

#### **Rule 19 ABATEMENT PLANS**

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OCD granted approval to install monitoring wells as proposed while reviewing plans for administrative completeness:

- 1. Stage 1 & 2 Abatement Plan for <u>Hobbs F-29 SWD</u> submitted on 10/27/2006 by R.T. Hicks Consultants. *Public notice ready to submit upon approval*. AP-64
- 2. Stage 1 Abatement Plan for <u>EME C-16(1) leak</u> submitted on 5/25/2007 by L. Peter Galusky; #1R0476 *Public notice ready to submit upon approval*.
- 3. Stage 1 Abatement Plan for <u>EME C-16(2) leak</u> submitted on 5/25/2007 by L. Peter Galusky; #1R0477 *Public notice ready to submit upon approval.*
- 4. Stage 1&2 Abatement Plan for <u>BD Santa Rita release</u> site submitted on 12/11/2006 by Trident. AP-58 *want to drill more MWs*

- 5. Stage 1&2 Abatement Plan for <u>EME jct. M-16-1</u> submitted on 1/29/2007 by Arcadis G&M. AP-42
- Stage 1&2 Abatement Plan for <u>EME jct. A-20</u> submitted on 1/29/2007 by Arcadis G&M. AP-43
- Stage 1 Abatement Plan for <u>BD H-35 pit</u> submitted by Arcadis G&M on 3/23/2007. #1R0216
- 8. Stage 1 & 2 Abatement Plan for <u>Justis jct. L-1 boot</u> submitted by Highlander on 1/17/07. AP-48

#### OCD WILL REVIEW

- Stage 1 Final Report & Closure Request for <u>EME jct. K-33-1</u> submitted by Whole Earth on 12/28/2006. AP-60 OCD requests confirmation of regional gradient/impact
- 2. CAP for <u>EME M-5 SWD</u> submitted by Hicks on 9/10/2004. #1R424
- 3. Rule 19 Release and CAP for soil for <u>BD jct. F-17</u> submitted by Highlander on 8/30/06. *Additional information requested by OCD was submitted on 12/29/06 and presented at meeting on 2/21/2007.* AP-47
- 4. Request for Release from Rule 19 for <u>EME H-13 release</u> submitted on 8/30/2006 by Highlander Environmental. AP-44 *Additional information requested by OCD was submitted on 12/29/06 and presented at meeting on 2/21/2007. Showed current site photos.*
- 5. Final Investigation Report & CAP for <u>EME jct. K-6</u> submitted by Trident on 3/7/2007. AP-46.

#### OTHER

- 1. CAP for <u>BD K-4 leak</u> submitted by Highlander on 4/23/2007. #1R0459 *APPROVAL to begin pumping from MW-1 as proposed; OCD will evaluate CAP (soil work)*
- 2. CAP for <u>BD O-17-1</u> vent submitted by Highlander on 5/11/2007. #1R426-12 No groundwater impact; soil work only ROC WILL REVISE AND RE-SUBMIT FOR CLARIFICATION

 GEOSYNTHETIC CLAY LINER (GCL) option for Junction Box Upgrade Program Modification request required; can be emailed. NMOCD Approved with conditions via email July 27, 2007

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# Corrective Action Plan for F-33

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Vent Junction Box Site Hobbs Salt Water Disposal System NMOCD Case #:1R0428-58

# **R.T. Hicks Consultants, LTD**

**January 15, 2007** 

901 RIO GRANDE BLVD. NW, SUITE F-142, ALBUQUERQUE, NM 87104

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## ▼ 1.0 EXECUTIVE SUMMARY

This Corrective Action Plan presents the results of the characterization activities performed by R.T. Hicks Consultants (Hicks Consultants) and Rice Operating Company (ROC) at the F-33 Vent Junction Box site located in the Hobbs Salt Water Disposal System (SWD) and proposes closure of the site after implementation of the selected remedy.

The selected remedy includes excavation and blending of the upper 16 feet of hydrocarbon-impacted soil, placing a clay barrier beneath the root zone, creation of an infiltration barrier through surface restoration and re-vegetation of the site, and natural biodegradation of the small mass of hydrocarbons that may reside in the vadose zone below the practical reach of a backhoe. Excavation and disposal of high concentration areas will be performed as required to facilitate. This remedy is protective of ground water quality, human health and the environment. After re-vegetation of the site, ROC will submit a final closure report.

#### **Data Summary**

- 1. Hicks Consultants supervised field activities at the F-33 Vent site in May 2006. This involved general reconnaissance as well as supervision of backhoe sampling of the upper vadose zone.
- 2. Due to safety concerns with the high voltage powerline immediately above the former vent, a backhoe was used to collect samples instead of a drilling rig, as originally proposed in the NMOCD-approved workplan. Samples were collected at 2 ft sample intervals from ground surface to a depth of 12 ft at points located approximately 10 feet east, west, north, and south of the former vent. In addition, samples were collected at 1 ft intervals to a depth of 16 ft at the former vent. Samples were field-tested for chloride content and screened with a photoionization detector (PID) for indications of hydrocarbons. Soil samples were also submitted to a laboratory for more detailed hydrocarbon analysis.
- 3. Chloride concentration data show concentrations in the vadose zone are less than 1,000 ppm. At the vent site, chloride concentrations were highest (848 mg/kg) at a depth of 6 feet bgs directly beneath the vent location and declined below 6 feet bgs to a concentration of 230 ppm at 16 feet. In all sampling excavations 10 feet east,



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Corrective Action Plan F-33 Vent Site NMOCD Gase #: 1R0428-58

north, south and west, chloride concentrations were less than 500 ppm. Chloride levels showed a consistent decline with depth.

- 4. Hydrocarbon impact is confined to the close vicinity of the vent and within the upper portion of the vadose zone. Although some samples from excavations detected hydrocarbon vapors in excess of 100 ppm, laboratory analyses detected neither benzene nor toluene. At the vent site, concentrations of ethylybenzene and xylene were 37.7 and 65.3 mg/kg respectively at a depth of 12 feet below land surface. At 16 feet below land surface in this same sampling excavation, the ethylybenzene concentrations was 27.7 mg/kg and the xylene concentration was 0.3 mg/kg. At sampling sites north, south, east and west of the vent, ethylbenzene and xylene concentrations are less than 1 ppm.
- 5. On July 20, 2006, an air rotary drilling rig was used to advance two soil borings as close to the former vent as possible, in an attempt to provide more certainty that hydrocarbon impact did not extend laterally into the deep vadose zone. These borings confirmed no chloride or hydrocarbon impact to the vadose zone at these two locations 22 feet east and 30 feet west of the vent, respectively. The borings were terminated at a depth of 50 feet bgs.
- 6. Based on data from other nearby sites, particularly the E-33-1 junction box site, depth to groundwater at the F-33 vent site is estimated at approximately 65 feet bgs.

#### Conclusions

- 1. At the vent site, concentrations of hydrocarbons decline with depth, based upon PID readings. Laboratory analyses show that neither benzene nor toluene were detected in any samples. Xylene declines from 65.3 mg/kg at 14 feet bgs to 0.3 mg/kg at 16 feet bgs and ethylbenzene declines form 37.7 mg/kg to 27.7 mg/kg in this same depth interval. From these data we conclude that the mass of subsurface hydrocarbons is small and limited to the upper vadose zone.
- 2. We conclude that the mass of subsurface chloride release at this site was not large enough to necessitate detailed simulation modeling of constituent fate and transport.



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Corrective Action Plan F-33 Vent Site NMOCD Case #: 1R0428-58

3. Re-vegetation of the site will reduce the infiltration of precipitation and minimize the potential for any constituents of concern to migrate downward to ground water.

#### **Recommendations**

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- Excavation of a 10-foot by 10-foot area at the former vent site to a depth of 12 feet and blending of material in the upper 12-feet of the vadose zone until field tests of the excavated soil mixture do not exceed 100 ppm of total organic vapors using a calibrated photoionization meter with the appropriate lamp (headspace method) and chloride concentrations in the backfill will not exceed 1,000 ppm. Disposal of high concentration zones of hydrocarbons may be necessary to meet the prescribed concentrations.
- 2. A minimum 10-12 inch thick clay layer will be installed at the base of the root zone, about 4 feet below ground surface. The clay layer will be sloped to the southeast, will extend laterally to deflect any potential infiltrating water from the surface and will be compacted according to protocols applied to backfill in new pipeline trenches.
- 3. Restoration and re-vegetation of the ground surface.
- 4. Upon documentation of these actions ROC will submit a closure report for the F-33 Vent Junction Box site and request closure of the regulatory file.



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**Corrective Action Plan F-33 Vent Site** NMOCD Case #: 180428-58

## ▼ 2.0 BACKGROUND

The Hobbs Salt Water Disposal System (SWD), which managed produced water from the late 1950s to the present, is now closed. Future releases from the system infrastructure are not possible. With the abandonment of the system in 2002, Rice Operating Company (ROC) excavated and removed the F-33 Vent. Closure of facilities like the F-33 Vent site within Hobbs SWD followed the July 16, 2003 NMOCD approved junction box investigation plan. This plan calls for delineation of any impact from these sites during the closure process and states:

If 12 feet vertical delineation at the source reveals Target Concentrations for TPH or BTEX will not meet NMOCD guidelines or TPH and BTEX will meet guidelines but there is not a significant decline vs. depth in chloride concentration, the site-impact is judged to be outside the scope of this work plan and will become a risk-based corrective action (RBCA) project-site.

The investigation and characterization used the same protocols as described in the NMOCD-approved work plan for the Section 29 sites and the field protocols were consistent with the Investigation Characterization Plan (ICP) submitted for the site (see Appendix A). However, the presence of electrical lines over the site prevented the use of a drill rig for deep vadose zone sampling, as originally proposed. Instead, a backhoe collected samples from the former vent site and nearby locations to the maximum reach of the backhoe, which is 14-16 feet. To determine if operation of the site caused lateral migration of chloride or hydrocarbons at depth, two soil borings were advanced as close as possible to the site.

#### 2.1 Location

Plate 1 is an aerial photograph of the site when it was active, taken between 1996 and 1998 that shows the location of the boring and nearby roads.

The site is within unit letter F, Section 33, Township 18S Range 38E.

#### 2.2 Characterization Activities

The investigation and characterization used the same protocols as described in the NMOCD-approved work plan for the Section 29 sites and was as consistent as possible with the Investigation Characterization Plan (ICP)



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Corrective Action Plan F-33 Vent Site NMOCD Case #: 180428-58

submitted for the site (see Appendix A) as possible given the site limitations noted in section 2.0 and below. In order to permit comparison of the results from site borings with the ambient chloride concentrations in the vadose zone, collection of samples from a background soil boring was a critical element of the ICP. Appendix B shows the results of field chloride measurements from the background soil boringlocated about 500 feet north of F-29-1b.

Due to safety concerns with the high voltage powerline immediately above the former vent, a backhoe under ROC supervision was used on May 22, 2006, to collect samples instead of a drilling rig. Samples were collected at 2 ft sample intervals from ground surface to a depth of 12 ft at points located approximately 10 feet east, west, north, and south of the former vent (figure 1). In addition, samples were collected at 1 ft intervals to a depth of 16 ft at the former vent. Samples were field-tested for chloride content and screened with a PID for indications of hydrocarbons.

On July 20, 2006, an air rotary drilling rig was used to advance two soil borings as close to the former vent as possible, in an attempt to delineate the hydrocarbon impact vertically identified by the previous backhoe sampling activities. The first boring (B-1) was advanced at a point 22 ft east of the vent. The second (B-2) was placed 30 ft west of the vent.

Based on the results from the backhoe and soil boring sampling activities hydrocarbon-impact was confirmed in the upper vadose zone and is confined within the near vicinity of the F-33 vent. All data shows that there is negligible chloride impact to the vadose zone. Appendix B presents the results of the field program.



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## **7** 3.0 CHARACTERISTICS OF THE VADOSE ZONE

As the boring logs in Appendix B show, the upper 2 feet of the vadose zone at the site is composed a highly indurated caliche layer. Beneath the caliche is an 18 foot thick layer of calcic very fine-grained sand. An 8 foot thick layer of very fine to fine-grained sand with less calcic content lies below fine sand described earlier and this unit is underlain by calcic very-fine to fine-grained sand which continued to a depth of 50 feet bgs in boring B-2. A fine-grained sand with little or no calcium carbonate content was observed from 50 feet to the bottom of boring B-2 at 52 feet bgs. The lithologic logs for the two borings are included in Appendix B.

Chloride concentrations ranged from a maximum of 848 ppm at a point 6 ft below the vent source to a concentration of 92 ppm at a point 2 ft below a spot located 10 ft south of the former vent (see figure). The chloride concentration vs. depth profile is displayed in Figure ?



Figure 2: Chloride Concentrations (mg/kg) versus Depth

Soil samples with the highest PID readings and the deepest intervals were submitted to the laboratory for detailed hydrocarbon analysis using Methods 8260 for BTEX constituents and Method 1006 (a modified 8015 gas chromatography) for gas and diesel range organics (GRO and DRO) and carbon fractionation. The laboratory analytical reports and chain of custody documentation are included in Appendix C. The PID readings vs. depth profile is displayed in Figure 3.



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Corrective Action Plan F-33 Vent Site NMOCD Case #: 1R0428-56



Based on the backhoe sampling results hydrocarbon-impact exists in the upper 16 feet of vadose zone and is confined within the near vicinity of the F-33 vent (less than 10-foot radius from the vent). Results of the laboratory analyses for regulated hydrocarbons are summarized in Table 1 below.

Location	Depth (Ft bgs)	Regulated Hydrocarbons (mg/kg)			
		В	Т	E	X
Vent Source	12'	<0.025	<0.025	37.7	65.3
	16'	<0.025	<0.025	27.7	0.3
10 ft east of Vent	4'	<0.025	< 0.025	0.513	0.429
	12'	<0.025	<0.025	0.516	<0.025
10 ft west of Vent	12'	<0.025	< 0.025	0.117	0.058
10 ft north of vent	8'	<0.025	<0.025	0.094	0.590
	12'	<0.025	<0.025	0.073	0.293

Table 1: Summary of Regulated Hydrocarbons in the Vadose Zone

PID readings measured 0 ppm for each 2 ft interval sampled from 4 ft bgs to 20 ft bgs and then at 5 ft intervals from 20 ft bgs to 40 ft bgs in each boring. Chloride field-testing measurements varied from a minimum of 28 ppm in the 20-22 ft interval in boring B-2 to a maximum of 410 ppm in the 16-18 ft and 20-22 ft intervals of boring B-1. Results of the soil borings confirmed that any chloride and hydrocarbon impact to the vadose zone is confined to the near vicinity of the F-33 vent.



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Corrective Action Plan F-33 Vent Site NMOCD Case #: 1R0428-58

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## ▼ 4.0 EVALUATION OF VERTICAL CHLORIDE FLUX

The chloride concentrations at the site are consistently well below 1,000 mg/kg. Moreover, chloride concentrations decrease with increasing depth, suggesting that saturated or near-saturated flow did not exist in the upper vadose zone. With the construction of the simple ET infiltration barrier described in section 6.0, unsaturated flow will decrease to near zero.



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Corrective Action Plan F-33 Vent Site NMOCD Case #: 180428-58

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## ▼ 5.0 EVALUATION OF VERTICAL HYDROCARBON FLUX

With the construction of the simple ET infiltration barrier, unsaturated flow will decrease to near zero and any hydrocarbons in the upper vadose zone will not represent a threat to fresh water. Because of the low concentrations and attendant small mass of hydrocarbons neither unsaturated zone modeling or additional characterization is necessary at this site.



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Corrective Action Plan F-33 Vent Site NMOCD Case #: 180428-58

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## ▼ 6.0 PROPOSED REMEDY

The proposed corrective action for this site is excavation of soils in the upper vadose zone to a depth of about 12 feet, which is the maximum reach of a standard backhoe, or to a shallower depth if field testing of soils shows that total organic vapors are less than 100 ppm. Field testing of soils employs the headspace method and a properly calibrated PID with a appropriate lamp. Soil with total organic vapor concentrations above 100 ppm as determined by field testing of soils will be hauled to an NMOCD-approved facility unless the volume of soil can be blended with clean soil and remediated on site. Upon completion of excavation activities, closure samples will be collected to verify hydrocarbon vapors do not exceed 100 ppm. Chloride concentrations in the back fill will not exceed 1,000 ppm.



Figure 4: Schematic diagram of ET Infiltration Barrier

As shown in Figure 4, a minimum 10-12 inch thick clay layer will be installed at the base of the root zone, about 4-feet below ground surface. The clay layer will be sloped to the southeast and will extend laterally to insure sufficient deflection of any potential infiltrating water originating from the surface. The clay layer will be compacted using the same protocols employed to compact backfill in new pipeline trenches. Any excavated material that is not suitable as topsoil will be placed below the clay layer. If possible, a thin layer of coarse sand or caliche gravel excavated from the site will be placed immediately below the clay layer. The backfill (above the clay layer) will be composed of blended or remediated soil and will be placed up to a depth no higher than 2 feet bgs. This topsoil will also be compacted according to the same protocols employed for backfilling new pipeline trenches.



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Corrective Action Plan F-33 Vent Site NMOCD Case # 1R0428-58

We propose incorporating clay and organic matter into the reserved topsoil and some sand/silt (as necessary) to create a 2-foot silt/loam topsoil surface layer, which will form an evapotranspiration (ET) barrier. HYDRUS-1D simulations of an ET infiltration barrier at other sites in the area and Sandia National Laboratory research of ET landfill covers demonstrate that vegetation on about 2-feet of fine-grained silt-loam effectively prevent measurable deep percolation of infiltration. This silt/loam soil combined with a vegetative cover will effectively sequester any residual hydrocarbons in the vadose zone. The surface will be contoured and reseeded with native vegetation to eliminate any ponding of precipitation and promote evapotranspiration, thereby minimizing natural infiltration. Over time, residual hydrocarbons will naturally biodegrade. Furthermore, the reduction of the deep percolation rate to essentially zero will prevent vertical migration of hydrocarbon constituents to ground water.



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Corrective Action Plan F-33 Vent Sile NMOCD Case #: 180428-58

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## ▼ 7.0 CRITERIA FOR CLOSURE

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After completion of the proposed remedy, ROC will submit a final report documenting the work elements identified herein and request closure of the regulatory file.



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Corrective Action Plan F-33 Vent Site NMOCD Case #: 1R0428-58




## R. T. HICKS CONSULTANTS, LTD.

1909 Brunson Ave ▲ Midland TX 79701 ▲ 432.638.8740 ▲ Fax: 413.403.9968

CERTIFIED MAIL - RETURN RECIEPT NO. 7099 3400 0017 1737 2367

January 20, 2006

Mr. Wayne Price New Mexico Oil Conservation Division 1220 South St. Francis Drive Santa Fe, New Mexico 87505

#### RE: Investigation Characterization Plan: T18S R38E: E-33-1 Junction Box, B-32 Boot, E-32-1 Junction Box, E-32-2 Junction Box, F-33 Vent

#### **Hobbs Salt Water Disposal System**

Dear Mr. Price:

On behalf of Rice Operating Company, please accept this submission as our Initial Characterization Plan (ICP) for the five (5) sites referenced above within the Hobbs Salt Water Disposal System (Plate 1).

Rice Operating Company (ROC) is the service provider (operator) for the Hobbs Saltwater Disposal System and has no ownership of any portion of pipeline, well, or facility. A consortium of oil producers who own the Hobbs System (System Partners); provide all operating capital on a percentage ownership/usage basis. Major projects require System Partner authorization for expenditures (AFE) approval and work begins as funds are received. We will implement the work outlined herein after NMOCD approval and subsequent authorization from the System Partners.

For all environmental projects, ROC will choose a path forward that:

- 1. protects public health,
- 2. provides the greatest net environmental benefit,
- 3. complies with NMOCD Rules, and
- 4. is supported by good science.

The last criteria employed when evaluating any proposed remedy or investigative work is confirming that there is a reasonable relationship between the benefits created by the proposed remedy or assessment and the economic and social costs.

Each site shall have three submissions or a combination of:

- 1. This <u>Investigation and Characterization Plan</u> (ICP) is a proposal for data gathering and site characterization and assessment.
- Upon evaluation of the data and results from the ICP, a recommended remedy will be submitted in a <u>Corrective Action Plan</u> (CAP).
- 3. Finally, after implementing the remedy, a <u>closure report</u> with final documentation will be submitted.

January 20, 2006 Page 2

#### Task 1 Evaluate Chloride and BTEXN Concentrations in Soil at Five Sites, Evaluate Ground Water Quality if Necessary

We will follow the same protocol for characterization of the unsaturated zone at the five new ROC sites listed below.

- o E-33-1 Junction Box
- o B-32 Boot
- E-32-1 Junction Box
- E-32-2 Junction Box
- o F-33 Vent

At each of the above-referenced sites, we will locate the sampling borehole as close as practical to the suspected release source. Earlier, we inspected each of the five sites nominated in this ICP and identified the boring location before the sites were backfilled and re-graded. Due to our recent experience with difficulties encountered in the installation of well clusters in this area, we plan to employ hollow-stem auger drilling techniques for sampling.

We will screen each sample in the field for chlorides and volatile organic compounds using the methods described in QP-03 and QP-07 (attached), respectively. Soil lithology and the presence of any observed staining or odor will be recorded. For any site, if we detect evidence of leakage within 15 feet of the water table (e.g. field chloride greater than 250 ppm in soil samples) we will complete the boring as a monitoring well in accordance with NMOCD Guidance. If three soil samples taken at 5-foot intervals test below 250 ppm chloride and below 100 ppm total volatile organic compounds, we will terminate the boring. However, all borings will penetrate at least 30 feet of the vadose zone.

#### Task 2 Evaluate Chloride and Hydrocarbon Flux from the Vadose Zone to Ground Water

We anticipate that one or all of the five sites selected for borehole investigation will show evidence of seepage from the source to a depth of more than 15-feet. For these sites, excavation and disposal of released material can cause more environmental damage than it cures. For such sites, we propose to employ HYDRUS-1D and a simple ground water mixing model to evaluate the potential of any residual chloride and hydrocarbon mass in the vadose zone to impair ground water quality above WQCC Standards. We have selected these two constituents for simulation modeling because each of these constituents is typically found in produced water and each is specifically regulated by New Mexico ground water regulations (WQCC). We will also employ vadose zone hydrocarbon migration predictive tools commonly employed by NMED in their PST program.

#### Task 3 Provide Investigative Results and/or Corrective Action Plan

Because the Hobbs SWD System no longer carries produced water, additional releases of produced water to ground water are highly unlikely. If modeling shows that the residual chloride and hydrocarbon mass in the vadose zone poses a no threat to ground water quality, we will prepare a report that makes this demonstration and request site closure.

January 20, 2006 Page 3

If simulation experiments suggest that residual constituents pose a threat to ground water quality or if the field program demonstrates impairment, we will expand upon the HYDRUS-1D model predictions described above to develop a remedy for the vadose zone. If necessary, we will simulate:

- 1. Excavation, disposal and replacement of clean soil to remove the chloride and hydrocarbon mass,
- 2. Installation of a low permeability barrier to minimize natural infiltration,
- 3. Surface grading and seeding to eliminate any ponding of precipitation and promote evapotranspiration, thereby minimizing natural infiltration, and
- 4. A combination of the above potential remedies.

We will select the vadose zone remedy that offers the greatest environmental benefit while causing the least environmental damage. If data suggest that the site has contributed chloride or hydrocarbons to ground water and caused ground water impairment, we will notify NMOCD and work collaboratively to determine the appropriate path forward.

#### **Proposed Schedule**

With NMOCD's approval of this work plan, we can perform the field activities at these sites in February or March. In late April or May, we plan to deliver any individual Correction Action Plans to address residual constituents in the vadose zone and any reports requesting site closure. If data suggest ground water impairment we plan to conduct two quarters of ground water monitoring to confirm any initial result then meet with NMOCD to develop an appropriate path forward. Your approval to move forward with this work plan will facilitate approval of expenditures by the System Partners.

Sincerely, R.T. Hicks Consultants, Ltd.

Libert O. Van Deventes

Gilbert Van Deventer Project Manager

cc: Chris Williams, NMOCD Hobbs District Office Carolyn Haynes, Rice Operating Company - Hobbs Kristin Pope, Rice Operating Company – Hobbs Randy Hicks, R. T. Hicks Consultants, Ltd. - Albuquerque



#### **Rice Operating Company**

#### **QUALITY PROCEDURE - 03**

Sampling and Testing Protocol - Chloride Titration Using .282 Normal Silver Nitrate Solution

#### 1.0 Purpose

This procedure is to be used to determine the concentration of chloride in soil.

#### 2.0 Scope

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This procedure is to be used as the standard field measurement for soil chloride concentrations.

#### 3.0 Sample Collection and Preparation

3.1 Collect at least 80 grams of soil from the sample collection point. Take care to insure that the sample is representative of the general background to include visible concentrations of hydrocarbons and soil types. If necessary, prepare a composite san1ple for soils obtained at several points in the sample area. Take care to insure that no loose vegetation, rocks or liquids are included in the sample(s).

3.2 The soil sample(s) shall be immediately inserted into a one-quart or large polyethylene freezer bag. Care should be taken to insure that no cross-contamination occurs between the soil sample and the collection tools or sample processing equipment.

3.3 The sealed sample bag should be massaged to break up any clods.

#### 4.0 Sample Preparation

4.1 Tare a clean glass vial having a minimum 40 ml capacity. Add at least 10 grams of the soil sample and record the weight.

4.2 Add at least 10 grams of reverse osmosis water to the soil sample and shake for 20 seconds.

4.3 Allow the sample to set for a period of 5 minutes or until the separation of soil and water.

4.4 Carefully pour the free liquid extract from the sample through a paper filter into a clean plastic cup if necessary.

#### 5.0 Titration Procedure

5.1 Using a graduated pipette, remove 10 m1 extract and dispense into a clean plastic cup.

5.2 Add 2-3 drops potassium chromate (K:zcrO4) to mixture.

5.3 If the sample contains any sulfides (hydrogen or iron sulfides are common to oilfield soil samples) add 2-3 drops of hydrogen peroxide (HZO2) to mixture.

5.4 Using a 10 ml pipette, carefully add .282 normal silver nitrate (one drop at a time) to the sample while constantly agitating it. Stop adding silver nitrate when the solution begins to change from yellow to red. Be consistent with endpoint recognition.

5.5 Record the ml of silver nitrate used.

6.0 Calculation

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To obtain the chloride concentration, insert measured data into the following formula:

<u>0.282 x 35,450 x ml AgNO<sub>3</sub></u>	X	grams of water in mixture
ml water extract		grams of soil in mixture

Using Step 5.0, determine the chloride concentration of the RO water used to mix with the soil sample. Record this concentration and subtract it from the formula results to find the net chloride in the soil sample.

Record all results on the delineation form.

#### **Rice Operating Company**

**QUALITY PROCEDURE -07** 

Sampling and Testing Protocol for VOC in Soil

#### 1.0 Purpose

This procedure is to be used to determine the concentrations of Volatile Organic Compounds in soils.

#### 2.0 Scope

This procedure is to be used as the standard field measurement for soil VOC concentrations. It is not to be used as a substitute for full spectrographic speciation of organic compounds.

#### **3.0 Procedure**

3.1 Sample Collection and Preparation

3.1.1 Collect at least 500 g. of soil from the sample collection point. Take care to insure that the sample is representative of the general background to include visible concentrations of hydrocarbons and soil types. If necessary, prepare a composite sample of soils obtained at several points in the sample area. Take care to insure that no loose vegetation, rocks or liquids are included in the sample(s).

3.1.2 The soil sample(s) shall be immediately inserted into a one-quart or larger polyethylene freezer bag and sealed. When sealed, the bag should contain a nearly equal space between the soil sample and trapped air. Record the sample name and the time that the sample was collected on the Field Analytical Report Form.

3.1.3 The sealed samples shall be allowed to set for a minimum of five minutes at a temperature of between 10-15 Celsius, (59-77° F). The sample temperatures may be adjusted by cooling the sample in ice, or by heating the sample within a generally controlled environment such as the inside of a vehicle. The samples should not be placed directly on heated surfaces or placed in direct heat sources such as lamps or heater vents.

3.1.4 The sealed sample bag should be massaged to break up any clods, and to provide the soil sample with as much exposed surface area as practically possible.

#### 3.2 Sampling Procedure

3.2.1 The instrument to be used in conducting VOC concentration testing shall be an Environmental Instruments 13471 OVM / Datalogger or a similar pro-type instrument. (Device will be identified on VOC Field

Test Report Form.) Prior to use, the instrument shall be zeroed-out in accordance with the appropriate maintenance and calibration procedure outlined in the instrument operation manual. The PID device will be calibrated each day it's used.

3.2.2 Carefully open one end of the collection bag and insert the probe tip into the bag taking care that the probe tip not touch the soil sample or the sidewalls of the bag.

3.2.3 Set the instrument to retain the highest result reading value. Record the reading onto the Field Test Report Form.

3.2.4 If the instrument provides a reading exceeding 100 ppm, proceed to conduct BTEX Speciation in accordance with QP-O2 and QP-O6. If the reading is 100 ppm or less, NMOCD BTEX guideline has been met and no further testing fur BTEX is necessary. File the Field Test Report Form in the project file.

#### 4.0 Clean-up

After testing, the soil samples shall be returned to the sampling location, and the bags collected for off-site disposal, IN NO CASE SHALL THE SAME BAG BE USED TWICE. EACH SAMPLE CONTAINER MUST BE DISCARDED AFTER EACH USE.

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Contract Pro-

							LITHOLOGIC LOG
	1.			MONITOR	WELL NO .:	B-2	TOTAL DEPTH: 40 Feet
	7				SITE ID:	Hobbs	F-33 Vent CLIENT: RJCE Operating Company
	- G			CON	ITRACTOR:	Harris	on & Cooper Drilling Inc. COUNTY: Lea
				DRILLING	METHOD:	Air Ro	Itary SIAIE: <u>New Mexico</u>
	¥.			COMPLET	ION DATE:	07/20	/06 FIELD REP.: G. Van Deventer / M. Franks
A CONTRACTOR			$\sim$	· COF # 221	OMMENTS:	Locate	ed 30 ft west of former vent location.
с. — (С. С.						Preser	nce of high voltage powerline prevented safe drilling directly above vent location.
USCS		Sample		Recovery	Chloride	PID	LITHOLOGIC DESCRIPTION:
CAL	Depth	Time	Туре	(inches)	(ppm)	(ppm)	LITHOLOGY, COLOR, GRAIN SIZE, SORTING, ROUNDING, CONSOLIDATION, DISTINGUISHING FEATURES
	5						Calcic very fine and fine-grained sand. Moderately hard to hard. Sand component is grayish orange (10, YR 7/4), fine-
Section 1		1030	Split Spoon	24*	144	0	grained, subangular, moderately well sorted, dry. Calcic matrix is very pale orange (10 YR 8/2)
			0.000	0.02			Cales you find and find project card. Moderately bard to hard. Sand companyly is gravity proport/10 VP7/4/ find
a start	10	1032	Split Spoon	24*	113	0	grained, subangular, moderately well sorted, dry. Calcic matrix is very pale orange (10 YR 8/2).
SM/CAL*							
CINECKAL							
		1035	Split Spoon	24"	86	0	Calcic very fine and fine-grained sand. Moderately hard to hard. Sand component is gravish orange (10 YR 7/4), fine- grained, subangular, moderately well sorted, dry. Calcic matrix is very pale orange (10 YR 8/2).
	15						
		1038	Split Spoon	12*	60	0	Calcic very fine and fine-grained sand. Moderately hard to hard. Sand component is gravish orange (10 YR.7/4), fine-
· · · · · · · · · · · · · · · · · · ·	20						
		1040	Split Spoon	12*	28	0	Very fine and fine-grained sand with less calcium carbonate. Light brown (5YR 6/4); subrounded, moderately sorted.
		AND	adiostriuse ( Seeverlatus)				
SW/SM	25	1051	Cuttinas	NA	58	0	Very line and fine-grained sand with less calcium carbonate. Light brown (5YR 6/4) subrounded, moderately sorted
			J				
	}						
1.1	30	1053	Cuttinas	NA	60	0	Calcic very line and fine-grained sand. Sand component is gravish orange (10 YR 7/4), fine-grained, subangular, moderately
							well sorted, dry. Calcic matrix is very pale orange (10 YR 8/2).
· ·							
SM/CAL	35	1057	Cuttinas	NA	57	0	Calcic very fine and fine-grained sand. Sand component is grayish orange (10 YR/7/4), fine-grained, subangular, moderately
			e annige				well sortêd, dry. Cálcic matrix is verý pale orangé (10 YR 8/2).
	40	1100	Split Spoon			0	Calcic very fine and fine-grained sand. Sand component is grayish brange (10 YR-7/4), fine-grained, subangular, moderately well sorted, dry. Calcic matrix is very pale orange (10 YR 8/2).
							Bottom of boring at 40 feet below ground surface.
	45						
	50						
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### Summary Table

	Sample	Location: Sou	rce		
Analysis	Analyical	Compounds	Sample	e Depth	
Anarysis	Method	Compounds	12' bgs	16' bgs	
		Benzene	< 0.025	< 0.025	
		Toluene	< 0.025	< 0.025	
BTEX 8	9021D	Ethylbenzene	37.7	27.7	
	00215	Xylene	65.3	0.3	
		Naphthalene	45.0	3.8	
		Total BTEXN	148	32	
		GRO	2250	1120	
ТРН	8015M	DRO	10470	11300	
		Total TPH	12720	12420	
		>C6-C8	50.8	<10	
		>C8-C10	421	110	
Aliphatics	TX1006	>C10-C12	892	345	
Anphanes	1/1000	>C12-C16	2460	1540	
		>C16-C21	2300	1830	
		>C21-C35	1690	1440	
		>C6-C8	6.44	5.77	
		>C8-C10	69.5	46.7	
Aromatics	TX1006	>C10-C12	290	146	
7 Homanes	1711000	>C12-C16	1340	769	
		>C16-C21	1760	1340	
		>C21-C35	1670	1390	

Analysis	Analyical	Compounds	Sample	Depth
7 mary 515	Method	compounds	4' bgs	12' bgs
		Benzene	< 0.025	< 0.025
		Toluene	< 0.025	< 0.025
DTEV	0001D	Ethylbenzene	0.513	0.516
DIEA	8021D	Xylene	0.429	< 0.025
		Naphthalene	0.200	0.495
		Total BTEXN	1.142	1.011
		GRO	596	25
TPH	8015M	DRO	10480	1180
		Total TPH	11076	1205
	TV1004	>C6-C8	<10	
		>C8-C10	45.4	
Aliphatics		>C10-C12	383	
Anphatics	IATUUU	>C12-C16	1800	
		>C16-C21	2300	
		>C21-C35	2660	
		>C6-C8	5.79	
		>C8-C10	45.8	
Aromatics	TX1006	>C10-C12	55.7	
210110105	1711000	>C12-C16	669	
		>C16-C21	1850	
		>C21-C35	2880	

#### Sample Location: 10 Feet East of Source

Samp	le Locatio	n: 10 Feet Nort	th of Sou	rce	Sample Location: 10 Feet West of Source					
Analysis	Analyical Method	Compounds	Sample	e Depth	Analysis	Analyical Method	Compounds	Sample Depth		
			8' bgs	12' bgs		memod		12' bgs		
		Benzene	< 0.025	< 0.025			Benzene	< 0.025		
		Toluene	< 0.025	< 0.025			Toluene	< 0.025		
DTEV	8021B	Ethylbenzene	0.094	0.073	RTEY	8021B	Ethylbenzene	0.117		
DILA	BIEX 8021B	Xylene	0.590	0.293	DIEA	0021D	Xylene	0.058		
		Naphthalene	0.103	0.202			Naphthalene	0.091		
		Total BTEXN	0.787	0.568			Total BTEXN	0.267		
		GRO	1540	1450			GRO	877		
ТРН	8015M	DRO	7462	7535	ТРН	8015M	DRO	7353		
		Total TPH	9002	8985			Total	8230		
		>C6-C8	<10	<10			>C6-C8			
		>C8-C10	268	126			>C8-C10			
Altobation	TV1006	>C10-C12	941	611	A 1: 1: 4:	TUDOC	>C10-C12			
Alipnatics	171000	>C12-C16	2650	1840	Aliphatics	171000	>C12-C16			
		>C16-C21	2470	1710			>C16-C21			
		>C21-C35	1840	1210			>C21-C35			
		>C6-C8	5.13	4.16			>C6-C8			
		>C8-C10	62.1	49.2			>C8-C10			
Aromatics	TV1006	>C10-C12	302	229	Aromatics	TY1006	>C10-C12			
Alomatics	Aromatics TX1006	>C12-C16	1070	882	Aromatics	171000	>C12-C16			
		>C16-C21	1520	1120			>C16-C21			
	L	>C21-C35	1230	984			>C21-C35			

Sample Lacation: 10 Feet West of Source

All concentrations listed in units of milligrams per kilogram (mg/kg)

# MULLIUM TRACEANALYSIS, INC. MULLIUM

6701 Aberdeen Avenue, Suite 9 155 McCutcheon, Suite H Lübbock, Texas 79424 800 • 378 • 1296 El Paso, Texas 79932 888 • 588 • 3443 E-Mail lab@traceanalysis.com 806•794•1296 FA 915•585•3443 FA

6 FAX 806•794•1298 13 FAX 915•585•4944

## **Analytical and Quality Control Report**

Kristen Farris-Pope Rice Operating Company 122 W Taylor Street Hobbs, NM, 88240

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Report Date: August 1, 2006

Work Order: 6072111

Project Location:Sec 33/F T185 R 38E,Hobbs,NMProject Name:Hobbs F-33 VentProject Number:Hobbs F-33 Vent

Enclosed are the Analytical Report and Quality Control Report for the following sample(s) submitted to TraceAnalysis, Inc.

			Date	Time	Date
Sample	Description	Matrix	Taken	Taken	Received
96002	B-1 (20'-22')	soil	2006-07-20	09:16	2006-07-20

These results represent only the samples received in the laboratory. The Quality Control Report is generated on a batch basis. All information contained in this report is for the analytical batch(es) in which your sample(s) were analyzed.

This report consists of a total of 4 pages and shall not be reproduced except in its entirety, without written approval of TraceAnalysis, Inc.

Michael abel

Dr. Blair Leftwich, Director

Report Date: August 1, 2006 Hobbs F-33 Vent

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## **Analytical Report**

#### Sample: 96002 - B-1 (20'-22')

Analysis: QC Batch: Pren Batch:	Chloride (IC) 28528 <sup><i>a</i></sup> 24944		A D S	nalytical Method: ate Analyzed: ample Preparation:	E 300.0 2006-07-30 2006-07-29			Prep Method: Analyzed By: Prepared By:	N/A WB WB
"Matrix spik	ke not reported %IA i	s 105 and RPD i	is 1.					P	
I I I I I I I I I I I I I I I I I I I									
Doromator		Flog	Pa	RL	Unite		Dilution		ΡI
Chloride		riag		280	mg/Kg		10		1.00
Matrix Blar	nk (1) QC Ba	tch: 28528							
OC Batch:	28528		Dat	e Analyzed: 200	06-07-30			Analyzed By:	WB
Prep Batch:	24944		QC	Preparation: 200	06-07-29			Prepared By:	WB
				MDI					
Parameter		Flag		Result	t	ι	Inits		RL
Chloride				< 0.0222	2	m	g/Kg	1 1 <u>1 1</u>	1
Laboratory QC Batch:	<b>Control Spike (</b> 28528	LCS-1)	Dat	e Analyzed: 200	06-07-30			Analyzed By:	WB
Laboratory QC Batch: Prep Batch:	<b>Control Spike (</b> 28528 24944	LCS-1)	Dat QC	e Analyzed: 200 Preparation: 200 Spike	06-07-30 06-07-29 Matrix			Analyzed By: Prepared By:	WB WB
Laboratory QC Batch: Prep Batch: Param	Control Spike ( 28528 24944 LCS Result	LCS-1) LCSD Result	Dat QC Units	e Analyzed: 200 Preparation: 200 Spike Dil. Amoun	06-07-30 06-07-29 Matrix 1t Result	Rec.	RPD	Analyzed By: Prepared By: Rec. Limit	WB WB RPD Limi
Laboratory QC Batch: Prep Batch: Param Chloride	Control Spike ( 28528 24944 LCS Result 13.2	LCS-1) LCSD Result 13.3	Dat QC Units mg/Kg	te Analyzed: 200 Preparation: 200 Spike Dil. Amoun 1 12.5	06-07-30 06-07-29 Matrix at Result <0.0222	Rec. 106	RPD 0	Analyzed By: Prepared By: Rec. Limit 90 - 110	WB WB RPD Limi 20
Laboratory QC Batch: Prep Batch: Param Chloride Percent reco	Control Spike ( 28528 24944 LCS Result 13.2 very is based on	LCS-1) LCSD Result 13.3 the spike resu	Dat QC <u>Units</u> mg/Kg ult. RPD is b	te Analyzed: 200 Preparation: 200 Spike Dil. Amoun 1 12.5 ased on the spike a	06-07-30 06-07-29 Matrix nt Result <0.0222 and spike duplicate	Rec. 106 result.	RPD 0	Analyzed By: Prepared By: Rec. Limit 90 - 110	WB WB RPD Limi 20
Laboratory QC Batch: Prep Batch: Param Chloride Percent reco Standard (I	Control Spike ( 28528 24944 LCS Result 13.2 very is based on CV-1)	LCS-1) LCSD Result 13.3 the spike resu	Dat QC <u>Units</u> mg/Kg ult. RPD is b	te Analyzed: 200 Preparation: 200 Spike Dil. Amoun 1 12.5 ased on the spike a	06-07-30 06-07-29 Matrix t Result <0.0222 and spike duplicate	Rec. 106 result.	RPD 0	Analyzed By: Prepared By: Rec. Limit 90 - 110	WB WB RPD Limi 20
Laboratory QC Batch: Prep Batch: <u>Param</u> <u>Chloride</u> Percent reco Standard (I QC Batch:	Control Spike ( 28528 24944 LCS Result 13.2 very is based on CV-1) 28528	LCS-1) LCSD Result 13.3 the spike resu	Dat QC <u>Units</u> mg/Kg ult. RPD is b Dat	e Analyzed: 200 Preparation: 200 Spike Dil. Amoun 1 12.5 ased on the spike a e Analyzed: 2000	06-07-30 06-07-29 Matrix nt Result <0.0222 and spike duplicate 6-07-30	Rec. 106 result.	RPD 0	Analyzed By: Prepared By: Rec. Limit 90 - 110 Analyzed By:	WB WB RPD Limi 20 WB
Laboratory QC Batch: Prep Batch: Param Chloride Percent reco Standard (I QC Batch:	Control Spike ( 28528 24944 LCS Result 13.2 very is based on CV-1) 28528	LCS-1) LCSD Result 13.3 the spike resu	Dat QC <u>Units</u> mg/Kg ult. RPD is b Dat ICV	e Analyzed: 200 Preparation: 200 Spike Dil. Amoun 1 12.5 ased on the spike a e Analyzed: 2000 's ICVs	06-07-30 06-07-29 Matrix nt Result <0.0222 and spike duplicate 6-07-30	Rec. 106 e result.	RPD 0 Percent	Analyzed By: Prepared By: Rec. Limit 90 - 110 Analyzed By:	WB WB Limi 20 WB
Laboratory QC Batch: Prep Batch: <u>Param</u> <u>Chloride</u> Percent reco Standard (I QC Batch:	Control Spike ( 28528 24944 LCS Result 13.2 very is based on CV-1) 28528	LCS-1) LCSD Result 13.3 the spike resu	Dat QC <u>Units</u> mg/Kg ult. RPD is b Dat ICV Tru	e Analyzed: 200 Preparation: 200 Spike Dil. Amoun 1 12.5 ased on the spike a e Analyzed: 2000 (s ICVs e Found	06-07-30 06-07-29 Matrix nt Result <0.0222 and spike duplicate 6-07-30 ICVs Percent Pagagar	Rec. 106 result.	RPD 0 Percent Recovery	Analyzed By: Prepared By: Rec. Limit 90 - 110 Analyzed By:	WB RPD Limi 20 WB
Laboratory QC Batch: Prep Batch: Param Chloride Percent reco Standard (I QC Batch: Param	Control Spike ( 28528 24944 LCS Result 13.2 very is based on CV-1) 28528 Flag	LCS-1) LCSD Result 13.3 the spike resu Units	Dat QC <u>Units</u> mg/Kg ult. RPD is b Dat ICV Tru Con	e Analyzed: 200 Preparation: 200 Spike Dil. Amoun 1 12.5 ased on the spike a e Analyzed: 2000 's ICVs e Found c. Conc.	06-07-30 06-07-29 Matrix at Result <0.0222 and spike duplicate 6-07-30 ICVs Percent Recover	Rec. 106 result.	RPD 0 Percent Recovery Limits	Analyzed By: Prepared By: Rec. Limit 90 - 110 Analyzed By: D Ana	WB RPD Limi 20 WB ate

Report Date: Hobbs F-33	Report Date: August 1, 200 Hobbs F-33 Vent		Work C Hob	Order: 6072111 bs F-33 Vent		Pag Sec 33/F T185 I	ge Number: 3 of 4 R 38E,Hobbs,NM
			CCVs T	CCVs	CCVs	Percent	
			Irue	Found	Percent	Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Chloride		mg/Kg	12.5	12.0	96	90 - 110	2006-07-30

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рюн Turn Around Time if different from standard 2 CHAIN-OF-CUSTODY AND ANALYSIS REQUEST No.) ANALYSIS REQUEST or Specify Method Dry Weight Basis Required Check If Special Reporting Limits Are Needed 47 TRRP Report Required Moisture Content Hq ,221,008 うち 1721 Pesticides 8081A / 608 PCB's 8082 / 608 GC/MS Semi. Vol. 8270C / 625 REMARKS ð 0 CC/W2 API' 8560B / 624 RCI TCLP Pesticides LAB Order ID # TCLP Semi Volatiles Circle 0 TCLP Volatiles mynn TCLP Metals Ag As Ba Cd Cr Pb Se Hg -AB USE Total Metals Ag As Ba Cd Cr Pb Se Hg 50105/2007 ONLY PAH 8270C / 625 Log-in-Review TPH 8015 GRO / DRO / TVHC Headspage Carrier # TPH 418.1 / TX1005 / TX1005 Ext(C35) Temp $\mathcal{I}$ Intact BTEX 8021B/602/8260B/624 80218 / 602 / 82608 / 624 MTBE In Franks & ricesuches Delle SAMPLING **JMIT** 155 McCutcheon Suite H EI Paso, Texas 79932 Tel (915) 585-3443 Fax (915) 585-4944 1 (888) 588-3443 ρ 10:00  $\sum_{i=1}^{n}$ 1/2% Phone # (505)393-9174 2 505) 397-147 erthicks consult, com Vent 5 **3TA**0 ł Time: :em 10: 2 7-33 NONE PRESERVATIVE 90 Conditions listed on reverse side of C. O. C. METHOD ICE en Signature 7 ar a HOPN 20 Date: Date: Date 6 er rises weller >000 "OS<sup>z</sup>H Project Name: Hobbs <sup>2</sup>ONH **FraceAnalysis**, Inc 10H E-mail: Fax #: SLUDGE MATRIX Received/at Laborator 5 ЯIA SOIF PURK 3240 ABTAW ceived by: Received by ş 5 Σ InnomA \ emuloV 2 Submittal of samples constitutes agreement to Terms and ò Hable # CONTAINERS ΝN VANE 1700 2115 Time: Time: ime RJAE Vent Melanis FIELD CODE 3 72-, XLIN 7/1-Date: (including state T185 Date Lubbock, Texas 79424 Tel (806) 794-1296 Fax (806) 794-1298 (1 (801) 378-1298 entail: lab@traceanalysis com 202 Aberdeen Avenue, Ste. ubbock Texas 79424  $\gamma$ (If different from above) 5  $\subseteq$ 000 0-1 11 Сотрану Name: Віск à Xen K ŝ Project Location m Contact Person Relinguished Relinquished ÷. Relinquished ŗ, 1000 JP LAB USE Invoice to: 990H Address: Project #: í. LAB # 0 ĕ.C 6701 7

Report Date: August 1, 2006 Hobbs F-33 Vent Work Order: 6072111 Hobbs F-33 Vent Page Number: 4 of 4 Sec 33/F T185 R 38E,Hobbs,NM

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## Analytical Report

**Prepared for:** 

Kristin Farris-Pope Rice Operating Co. 122 W. Taylor Hobbs, NM 88240

Project: F-33 Vent (UN0080) Project Number: Hobbs Abandonment Location: T18S, R38E, Sec. 33, Unit Letter F

Lab Order Number: 6E25001

Report Date: 06/07/06

Rice Operating Co. 122 W. Taylor Hobbs NM, 88240	Project: F-33 Vent (U Project Number: Hobbs Aban Project Manager: Kristin Farri	F	Fax: (505) 397-1471 <b>Reported:</b> 06/07/06 10:45							
ANALYTICAL REPORT FOR SAMPLES										
Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received						
Source 12'	6E25001-01	Soil	05/22/06 10:30	05/25/06 08:00						
Source 16'	6E25001-02	Soil	05/22/06 11:10	05/25/06 08:00						
10' east 4'	6E25001-03	Soil	05/22/06 11:55	05/25/06 08:00						
10' east 12'	6E25001-04	Soil	05/22/06 14:04	05/25/06 08:00						
10' north 8'	6E25001-05	Soil	05/22/06 14:10	05/25/06 08:00						

6E25001-06

6E25001-07

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05/22/06 14:25

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Rice Operating Co.		1	Project: F-3	3 Vent (UN	10080)			Fax: (505) 3	97-1471
122 W. Taylor		Project N	lumber: Hot	bs Abando	onment			Report	ed:
Hobbs NM, 88240		Project M	anager: Kris	tin Farris-	Pope			06/07/06	10:45
		O	rganics by	y GC					
		Environ	mental L	ab of Te	exas			<u>,</u>	
Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Source 12' (6E25001-01) Soil									
Carbon Ranges C6-C12	2250	20.0	mg/kg dry	2	EF60219	06/02/06	06/05/06	EPA 8015M	
Carbon Ranges C12-C28	9470	20.0	"		•	"		**	
Carbon Ranges C28-C35	1000	20.0	n	,,	"	"	**	**	
Total Hydrocarbon nC6-nC35	12700	20.0	••	**	"	n	**		
Surrogate: 1-Chlorooctane		67.4 %	70-1	30	"		n	"	S-06
Surrogate: 1-Chlorooctadecane		59.6 %	70-1	30	"	"	"	"	S-06
Source 16' (6E25001-02) Soil									
Carbon Ranges C6-C12	1120	20.0	mg/kg dry	2	EF60219	06/02/06	06/05/06	EPA 8015M	
Carbon Ranges C12-C28	9970	20.0	**	"	H.	"	*	"	
Carbon Ranges C28-C35	1330	20.0	"		H.	"	"		
Total Hydrocarbon nC6-nC35	12400	20.0	"	**			**	*	
Surrogate: 1-Chlorooctane		58.4 %	70-1	30	"	17	"	n	S-06
Surrogate: I-Chlorooctadecane		58.2 %	70-1	30	"	"	"	"	S-06
10' east 4' (6E25001-03) Soil									
Carbon Ranges C6-C12	596	20.0	mg/kg dry	2	EF60219	06/02/06	06/05/06	EPA 8015M	
Carbon Ranges C12-C28	8900	20.0	**				"	"	
Carbon Ranges C28-C35	1580	20.0		"	**	н	"	**	
Total Hydrocarbon nC6-nC35	11100	20.0	••			"			
Surrogate: 1-Chlorooctane		52.8 %	70-1	30	"	"	"	"	S-06
Surrogate: 1-Chlorooctadecane		54.2 %	70-1	30	"	"	"	"	S-06
10' east 12' (6E25001-04) Soil									
Carbon Ranges C6-C12	24.8	20.0	mg/kg dry	2	EE62507	05/25/06	05/26/06	EPA 8015M	
Carbon Ranges C12-C28	978	20.0	"		"			**	
Carbon Ranges C28-C35	202	20.0	"	н	"			13	
Total Hydrocarbon nC6-nC35	1200	20.0		"	11	0		14	
Surrogute: 1-Chlorooctane		52.6 %	70-1.	30	"	"	"	"	S-06
Surrogate: 1-Chlorooctadecane		55.2 %	70-1.	30	"	"	"	<i>n</i>	S-06

The results in this report apply to the samples analyzed in accordance with the samples received in the laboratory. This analytical report must be reproduced in its entirety, with written approval of Environmental Lub of Texas.

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Rice Operating Co. 122 W. Taylor Hobbs NM, 88240		Project N Project M	Project: F-3 lumber: Hol anager: Kri	3 Vent (UN bbs Abando stin Farris-	NOOSO) onment Pope			Fax: (505) 3 Report 06/07/06	397-1471 1ed: 10:45
		O	rganics b	y GC					
		Environ	mental L	ab of Te	exas				
Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
10' north 8' (6E25001-05) Soil									
Carbon Ranges C6-C12	1540	20.0	mg/kg dry	2	EF60219	06/02/06	06/05/06	EPA 8015M	
Carbon Ranges C12-C28	6860	20.0	"			"	"	,,	
Carbon Ranges C28-C35	602	20.0	"					н	
Total Hydrocarbon nC6-nC35	9000	20.0			"	"	**	**	
Surrogate: 1-Chlorooctane		69.6 %	70-1	30	"	"	"	17	S-06
Surrogate: 1-Chlorooctadecane		68.2 %	70-1	30	"	"	"	"	S-06
10' north 12' (6E25001-06) Soil									
Carbon Ranges C6-C12	1450	20.0	mg/kg dry	2	EF60219	06/02/06	06/05/06	EPA 8015M	
Carbon Ranges C12-C28	6910	20.0	"	"	11	"			
Carbon Ranges C28-C35	625	20.0		"	"			"	
Total Hydrocarbon nC6-nC35	8980	20.0	**	"	"	"		*	
Surrogate: 1-Chlorooctane		66.8 %	70-1	30	"	"	"	л	S-06
Surrogate: 1-Chlorooctadecane		69.8 %	70-1	30	"	"	"	"	S-06
10' west 12' (6E25001-07) Soil									
Carbon Ranges C6-C12	877	20.0	mg/kg dry	2	EE62507	05/25/06	05/28/06	EPA 8015M	
Carbon Ranges C12-C28	6750	20.0	**	н	n		**	••	
Carbon Ranges C28-C35	603	20.0	и		"	*	"	**	
Fotal Hydrocarbon nC6-nC35	8230	20.0	"	n		11	"	**	
Surrogate: 1-Chlorooctane		57.4 %	70-1	30	"	"		"	S-06
Surrogate: 1-Chlorooctadecane		59.4 %	70-1	30	"	"	"	"	S-06

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#### Project: F-33 Vent (UN0080) Project Number: Hobbs Abandonment Project Manager: Kristin Farris-Pope

#### Fractionation of Aliphatics by TNRCC Method 1006

#### **Environmental Lab of Texas**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Note
L									
 C6-C8	50.8	10.0	mg/kg dry	1	EF60608	06/02/06	06/06/06	TX 1006	
>C8-C10	421	10.0	11	"		"	"		
>C10-C12	892	10.0	"	17			"	*	
>C12-C16	2460	10.0	"		"	"	"	**	
>C16-C21	2300	10.0	"	"	"	н	**	•	
>C21-C35	1690	10.0		"	*1	"		•	
Total Hydrocarbon nC6-nC35	7810	10.0	"	"	"		"	55	
Source 16' (6E25001-02) Soil									
C6-C8	ND	10.0	mg/kg dry	1	EF60608	06/02/06	06/06/06	TX 1006	
>C8-C10	110	10.0	"			"			
>C10-C12	345	10.0	**	"		"			
>C12-C16	1540	10.0	**	"	"	"	μ	**	
>C16-C21	1830	10.0	"	"	n	"		н	
>C21-C35	1440	10.0	"			"			
Total Hydrocarbon nC6-nC35	5260	10.0	**	"	"	"	"	н	
10' east 4' (6E25001-03) Soil									
C6-C8	ND	10.0	mg/kg dry	1	EF60608	06/02/06	06/06/06	TX 1006	
>C8-C10	45.4	10.0	"	"	n	"	**		
>C10-C12	383	10.0	"		"			"	
>C12-C16	1800	10.0	"	"	ч	"	"		
>C16-C21	2300	10.0	"	"	и	"	**		
>C21-C35	2660	10.0	"	"	"	"			
Total Hydrocarbon nC6-nC35	7190	10.0	"	"		"	"	"	
10' north 8' (6E25001-05) Soil									
C6-C8	ND	10.0	mg/kg dry	1	EF60608	06/02/06	06/06/06	TX 1006	
>C8-C10	268	10.0	"		"		•	"	
>C10-C12	941	10.0	17	"	"	"	•	"	
>C12-C16	2650	10.0	"	"		"			
>C16-C21	2470	10.0	п	"		"		"	
>C21-C35	1840	10.0			н	"	**	*	
Total Hydrocarbon nC6-nC35	8170	10.0			n		••		

The results in this report apply to the samples analyzed in accordance with the samples received in the laboratory. This analytical report must be reproduced in its entirety, with written approval of Environmental Lab of Texas.

Rice Operating Co.	Project:	F-33 Vent (UN0080)	Fax: (505) 397-1471
122 W. Taylor	Project Number:	Hobbs Abandonment	Reported:
Hobbs NM, 88240	Project Manager:	Kristin Farris-Pope	06/07/06 10:45

#### Fractionation of Aliphatics by TNRCC Method 1006

#### **Environmental Lab of Texas**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
10' north 12' (6E25001-06) Soil								<u> </u>	
C6-C8	ND	10.0	mg/kg dry	1	EF60608	06/02/06	06/06/06	TX 1006	
>C8-C10	126	10.0	••					u.	
>C10-C12	611	10.0			"				
>C12-C16	1840	10.0	"	"	"		н		
>C16-C21	1710	10.0		17			н	"	
>C21-C35	1210	10.0			"			н	
Total Hydrocarbon nC6-nC35	5500	10.0			"	0	"	"	

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Rice Operating Co.			Project: F-3	3 Vent (UN	10080)			Fax: (505) 1	397-1471
122 W. Taylor		Project N	lumber: Hol	bs Abando	nment			Repor	ted:
Hobbs NM, 88240		Project M	anager: Kri	stin Farris-I	Pope			06/07/06	10:45
	Fractiona	tion of Aro	matics b	y TNRC	C Meth	od 1006			
		Environ	mental L	ab of Te	exas				
Ambuta	Pound	Reporting	Itaita						
Analyte	Kesult	Linit	Clints	Dilution	Batch	Prepared	Analyzed	Method	Notes
Source 12 (6E.25001-01) Son	<b></b>								
C7-C8	J [6.44]	10.0	ıng/kg dry	1	EF60608	06/02/06	06/06/06	TX 1006	
>C8-C10	69.5	10.0	"	"	"	"	"	11	
>C10-C12	290	10.0	"	"	11	0	11	11	
>C12-C16	1340	10.0	"	"	"	"	31	11	
>C16-C21	1760	10.0	"		"	*1	"	,,	
>C21-C35	1670	10.0	n	"	•	"		n	
Total Hydrocarbon nC6-nC35	5130	10.0	**	n	"	"	"		
Source 16' (6E25001-02) Soil									
C7-C8	J [5.77]	10.0	mg/kg dry	1	EF60608	06/02/06	06/06/06	TX 1006	
>C8-C10	46.7	10.0	"	н		н	Ð	**	
>C10-C12	146	10.0	"	"	"	"	"	17	
>C12-C16	769	10.0	**			"	и	17	
>C16-C21	1340	10.0	,,			"		"	
>C21-C35	1390	10.0	**	**	••	н			
Total Hydrocarbon nC6-nC35	3690	10.0	"	и	"			"	
10' east 4' (6E25001-03) Soil									
C7-C8	J [5.79]	10.0	mg/kg dry	1	EF60608	06/02/06	06/06/06	TX 1006	L
>C8-C10	45.8	10.0	"	"	"	"	п	"	
>C10-C12	55.7	10.0	*1	"	н		0	"	
>C12-C16	669	10.0	"	ir.		"	*1		
>C16-C21	1850	10.0		"		"	"	"	
>C21-C35	2880	10.0	"	,,	"	"	"		
Total Hydrocarbon nC6-nC35	5500	10.0			"	"		"	
10' north 8' (6E25001-05) Soil									
C7-C8	J [5.13]	10.0	mg/kg dry	1	EF60608	06/02/06	06/06/06	TX 1006	
>C8-C10	62.1	10.0					U.	"	
>C10-C12	302	10.0			"		"	"	
>C12-C16	1070	10.0			н			n	
>C16-C21	1520	10.0			"	,,			
>C21-C35	1230	10.0	••	.,	**	"		"	
Total Hydrocarbon nC6-nC35	4180	10.0					и		

Environmental Lab of Texas

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The results in this report apply to the samples analyzed in accordance with the samples received in the laboratory. This analytical report must be reproduced in its entirety, with written approval of Environmental Lab of Texas.

Page 6 of 21

Rice Operating Co.	Project: F-33 Vent (UN0080)	Fax: (505) 397-1471
122 W. Taylor	Project Number: Hobbs Abandonment	Reported:
Hobbs NM, 88240	Project Manager: Kristin Farris-Pope	06/07/06 10:45

#### Fractionation of Aromatics by TNRCC Method 1006

#### **Environmental Lab of Texas**

Analyte	Result	Reporting	Units	Dilution	Patch	Proporad	Analyzad	Mathad	Notes
10' north 12' (6E25001-06) Soil					Daten	Trepared	Anaryzeu		Notes
 C7-C8	J [4.16]	10.0	mg/kg dry	1	EF60608	06/02/06	06/06/06	TX 1006	
>C8-C10	49.2	10.0	"		n	"	"		
>C10-C12	229	10.0	"		n	"		"	
>C12-C16	882	10.0			и	"	"	"	
>C16-C21	1120	10.0			и		"	15	
>C21-C35	984	10.0		**	11	"		"	
Total Hydrocarbon nC6-nC35	3260	10.0			"	"	"	"	

Environmental Lab of Texas

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**Reported:** 06/07/06 10:45

#### General Chemistry Parameters by EPA / Standard Methods

#### **Environmental Lab of Texas**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Source 12' (6E25001-01) Soil									
% Moisture	11.1	0.1	%	1	EE62607	05/25/06	05/26/06	% calculation	
Source 16' (6E25001-02) Soil									
Chloride	143	10.0	mg/kg	20	EE63005	05/29/06	05/29/06	EPA 300.0	
% Moisture	14.0	0.1	%	1	EE62607	05/25/06	05/26/06	% calculation	
10' east 4' (6E25001-03) Soil									
Chloride	341	10.0	mg/kg	20	EE63005	05/29/06	05/29/06	EPA 300.0	
% Moisture	9.8	0.1	%	1	EE62607	05/25/06	05/26/06	% calculation	
10' east 12' (6E25001-04) Soil									
% Moisture	8.7	0.1	%	1	EE62607	05/25/06	05/26/06	% calculation	
10' north 8' (6E25001-05) Soil									
% Moisture	4.3	0.1	%	1	EE62607	05/25/06	05/26/06	% calculation	
10' north 12' (6E25001-06) Soil									
% Moisture	3.7	0.1	%	1	EE62607	05/25/06	05/26/06	% calculation	
10' west 12' (6E25001-07) Soil									
% Moisture	4.6	0.1	%	1	EE62607	05/25/06	05/26/06	% calculation	

The results in this report apply to the samples analyzed in accordance with the samples received in the laboratory. This analytical report must be reproduced in its entirety, with written approval of Environmental Lab of Texas.

Rice Operating Co.	Project: F-33 Vent (UN0080)	Fax: (505) 397-1471
122 W. Taylor	Project Number: Hobbs Abandonment	Reported:
Hobbs NM, 88240	Project Manager: Kristin Farris-Pope	06/07/06 10:45

#### Volatile Organic Compounds by EPA Method 8260B

#### **Environmental Lab of Texas**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Source 12' (6E25001-01) Soil	<u></u>							· · ····	
Benzene	ND	50.0	ug/kg dry	50	EE62606	05/26/06	05/31/06	EPA 8260B	
Toluene	ND	50.0	•	*		"			
Ethylbenzene	3770	50.0			.,	"	"	21	
Xylene (p/m)	171	50.0	"	"				21	
Xylene (0)	J [48.2]	50.0		n	"				
Naphthalene	4500	50.0		"	"	"		'n	
Surrogate: Dibromofluoromethane	······································	107 %	70-1	39	"	"	"	v	
Surrogate: 1,2-Dichloroethane-d4		87.6 %	. 52-1	49	"	"	"	ρ	
Surrogate: Toluene-d8		84.2 %	76-1	25	"	**	"	u	
Surrogate: 4-Bromofluorohenzene		87.6 %	66-1	45	"	"	"	"	
Source 16' (6E25001-02) Soil									
Benzene	ND	25.0	ug/kg dry	25	EE62606	05/26/06	05/31/06	EPA 8260B	
Toluene	ND	25.0		"	"	"		"	
Ethylbenzene	277	25.0		н	"	"	н	**	
Xylene (p/m)	28.2	25.0	••		"	u.	"	rr -	
Xylene (o)	ND	25.0		"	"	"	**	34	
Naphthalene	378	25.0			и				
Surrogate: Dibromofluoromethane		100 %	70-1	39	"	#	"	u.	
Surrogate: 1,2-Dichloroethane-d4		79.2 %	52-1	49	"	"	"	"	
Surrogate: Toluene-d8		83.2 %	76-1	25	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		100 %	66-1	45	"	"	"	"	
10' east 4' (6E25001-03) Soil									
Benzene	ND	25.0	ug/kg dry	25	EE62606	05/26/06	05/31/06	EPA 8260B	
Toluene	ND	25.0	17	"	"	"			
Ethylbenzene	51.3	25.0	"	**	"	"	**	88	
Xylene (p/m)	J [24.1]	25.0	n		"		"		
Xylene (o)	J [18.8]	25.0		91	"		"	**	
Naphthalene	200	25.0		"	"	u 		tı	
Surrogate: Dibromofluoromethane		104 %	70-1	39	**		"	33	
Surrogate: 1,2-Dichloroethane-d4		86.2 %	52-1	49	"	"	"	"	
Surrogate: Toluene-d8		87.6 %	76-1	25	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		94.4 %	66-1	45	"	"		"	

Environmental Lab of Texas

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#### Project: F-33 Vent (UN0080) Project Number: Hobbs Abandonment Project Manager: Kristin Farris-Pope

#### Volatile Organic Compounds by EPA Method 8260B

#### **Environmental Lab of Texas**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
10' east 12' (6E25001-04) Soil							· · ·		
Benzene	ND	25.0	ug/kg dry	25	EE62606	05/26/06	05/31/06	EPA 8260B	
Toluene	ND	25.0	"	"	11	"	"		
Ethylbenzene	51.6	25.0	"			"		"	
Xylene (p/m)	ND	25.0	"	•	"		"	"	
Xylene (o)	ND	25.0		"	"	"			
Naphthalene	49.5	25.0		•	"	11	п	"	
Surrogate: Dibromofluoromethane		100 %	70-1	39	"	"	11	"	
Surrogate: 1,2-Dichloroethane-d4		81.6 %	52-1	49	"	"	"	"	
Surrogate: Toluene-d8		87.4 %	76-1	25	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		82.6 %	66-1	45	"	"	"	"	
10' north 8' (6E25001-05) Soil									
Benzene	ND	25.0	ug/kg dry	25	EE62606	05/26/06	05/31/06	EPA 8260B	
Toluene	ND	25.0		"	"	"	**	0	
Ethylbenzene	93.8	25.0				0	n	**	
X <u>y</u> lene (p/m)	254	25.0	"				н	**	
Xylene (0)	336	25.0	м	"		"		**	
Naphthalene	103	25.0	"	•				34	
Surrogate: Dibromofluoromethane		98.0 %	70-1	39	"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4		78.6 %	52-1	49	"	"	"	"	
Surrogate: Toluene-d8		82.6 %	76-1	25	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		123 %	66-1	45	"	"	"	"	
10' north 12' (6E25001-06) Soil									
Benzene	ND	25.0	ug/kg dry	25	EE62606	05/26/06	05/31/06	EPA 8260B	
Toluene	ND	25.0	"	н		"	31	"	
Ethylbenzene	72.8	25.0	"			"	**	**	
Xylene (p/m)	101	25.0	"		"	"			
Xylene (0)	192	25.0	"	*	"	п	"	**	
Naphthalene	202	25.0	"	**	"		"	n	
Surrogate: Dibromofluoromethane		101 %	70-1	39	"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4		80.0 %	52-1	49	"	"	"	0	
Surrogate: Toluene-d8		84.4 %	76-1	25	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		116 %	66-1	45	"	"	"	"	

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#### Project: F-33 Vent (UN0080) Project Number: Hobbs Abandonment Project Manager: Kristin Farris-Pope

**Reported:** 06/07/06 10:45

#### Volatile Organic Compounds by EPA Method 8260B

#### **Environmental Lab of Texas**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
10' west 12' (6E25001-07) Soil							· · · · · · · · · · · · · · · · · · ·		
Benzene	ND	25.0	ug/kg dry	25	EE62606	05/26/06	05/31/06	EPA 8260B	
Toluene	ND	25.0	"		"	"		*	
Ethylbenzene	117	25.0			"			"	
Xylene (p/m)	25.1	25.0		**			"	"	
Xylene (0)	33.0	25.0		**				"	
Naphthalene	91.4	25.0			"	"	•		
Surrogate: Dibromofluoromethane		99.8 %	70-1	39	"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4		80.4 %	52-1	49	"	"	"	"	
Surrogate: Toluene-d8		86.2 %	76-1	25	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		102 %	66-1	45	"	"	"	"	

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Rice Operating Co.		ł	Project: F-3	3 Vent (UN	0080)				Fax: (505)	397-1471
122 W. Taylor		Project N	umber: Ho	bbs Abandor	nment				Repo	rted:
Hobbs NM, 88240		Project Ma	anager: Kri	stin Farris-P	ope				06/07/0	6 10:45
	Or	ganics by	v GC - 0	uality Co	ontrol					,
	01	Environi	mental L	ab of Te	xas					
		Reporting		Spike	Source	•	%REC		RPĎ	
Analyte	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes
Batch EE62507 - Solvent Extraction (GC)										
Blank (EE62507-BLK1)				Prepared: (	05/25/06 A	nalyzed: 05	6/26/06			
Carbon Ranges C6-C12	ND	10.0	mg/kg wet							
Carbon Ranges C12-C28	ND	10.0								
Carbon Ranges C28-C35	ND	10.0	11							
Total Hydrocarbon nC6-nC35	ND	10.0	"							
Surrogate: 1-Chlorooctane	43.6		mg/kg	50.0		87.2	70-130			
Surrogate: 1-Chlorooctadecane	45.3		"	50.0		90.6	70-130			
LCS (EE62507-BS1)				Prepared: (	)5/25/06 A	nalyzed: 05	6/26/06			
Carbon Ranges C6-C12	546	10.0	mg/kg wet	500		109	75-125			
Carbon Ranges C12-C28	561	10.0	"	500		112	75-125			
Total Hydrocarbon nC6-nC35	1110	10.0	"	1000		111	75-125			
Surrogate: 1-Chlorooctane	57.6		mg/kg	50.0		115	70-130			
Surrogate: 1-Chlorooctadecane	49.2		"	50.0		98.4	70-130			
Calibration Check (EE62507-CCV1)				Prepared: (	)5/25/06 A	nalyzed: 05	6/30/06			
Carbon Ranges C6-C12	268		mg/kg	250		107	80-120			
Carbon Ranges C12-C28	286		"	250		114	80-120			
Total Hydrocarbon nC6-nC35	554		"	500		111	80-120			
Surrogate: 1-Chlorooctane	64.4		"	50.0		129	70-130			
Surrogate: 1-Chlorooctadecane	62.4		"	50.0		125	70-130			
Matrix Spike (EE62507-MS1)	Sour	ce: 6E24006	5-01	Prepared: (	)5/25/06 A	nalyzed: 05	6/26/06			
Carbon Ranges C6-C12	573	10.0	mg/kg dry	520	ND	110	75-125			
Carbon Ranges C12-C28	576	10.0		520	NÐ	111	75-125			
Total Hydrocarbon nC6-nC35	1150	10.0		1040	ND	111	75-125			
Surrogate: 1-Chlorooctane	55.5		ing/kg	50.0		111	70-130			
Surrogate: 1-Chlorooctadecane	50.2		"	50.0		100	70-130			

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Page 12 of 21

Rice Operating Co. 122 W. Taylor Hobbs NM 88240		F Project N Project M	Project: F-3 umber: Hol anager: Kri	3 Vent (UN) obs Abandor stin Farris-P	)080) iment				Fax: (505) Repo 06/07/0	397-1471 rted: 6 10:45
	Or	anics h		nolity Co	ntrol		· · · · · · · · · · · · · · ·			
		ganics by Environi	y GC - Q nental L	ab of Tey	as					
Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch EE62507 - Solvent Extraction (GC	)									
Matrix Spike Dup (EE62507-MSD1)	Sour	ce: 6E24006	5-01	Prepared: (	)5/25/06 A	nałyzed: 05	5/31/06			
Carbon Ranges C6-C12	575	10.0	mg/kg dry	520	ND	111	75-125	0.348	20	
Carbon Ranges C12-C28	579	10.0	"	520	ND	111	75-125	0.519	20	
Total Hydrocarbon nC6-nC35	1150	10.0	*	1040	ND	111	75-125	0.00	20	
Surrogate: 1-Chlorooctane	56.1		mg/kg	50.0		112	70-130			
Surrogate: 1-Chlorooctadecane	49.8		"	50.0		99.6	70-130			
Blank (EF60219-BLK1)	ND	10.0	mg/kg wet	Prepared: (	06/02/06 A	nalyzed: 06	6/05/06	· · · · · · · · · · · · · · · · · · ·		
Blank (EF60219-BLK1)	× 14-5			Prepared: (	06/02/06 A	nalyzed: 00	6/05/06	·····		
Carbon Ranges C12-C28	ND	10.0	"							
Carbon Ranges C28-C35	ND	10.0	"							
Fotal Hydrocarbon nC6-nC35	ND	10.0	"							
Surrogate: 1-Chlorooctane	45.4	·····	mg/kg	50.0		90.8	70-130		· · · · · · · · · · · · · · · · · · ·	
Surrogate: 1-Chlorooctadecane	46.5		"	50.0		93.0	70-130			
LCS (EF60219-BS1)				Prepared: 0	06/02/06 As	nalyzed: 06	05/06			
Carbon Ranges C6-C12	567	10.0	mg/kg wet	500		113	75-125			
Carbon Ranges C12-C28	554	10.0	"	500		111	75-125			
Fotał Hydrocarbon nC6-nC35	1120	10.0	"	1000		112	75-125			
Surrogate: 1-Chlorooctane	58.5		mg/kg	50.0		117	70-130			
Surrogate: 1-Chlorooctadecane	52.7		"	50.0		105	70-130			
Calibration Check (EF60219-CCV1)				Prepared: 0	06/02/06 A	nalyzed: 06	/05/06			
Carbon Ranges C6-C12	290		mg/kg	250		116	80-120			
Carbon Ranges C12-C28	294		"	250		118	80-120			
Total Hydrocarbon nC6-nC35	584		**	500		117	80-120			
Surrogate: 1-Chlorooctane	57.9		"	50.0		116	70-130			
Surrogate: 1-Chlorooctadecane	58.2		"	50.0		116	70-130			

Environmental Lab of Texas

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Rice Operating Co.	Project: F-33 Vent (UN0080)	Fax: (505) 397-147
122 W. Taylor	Project Number: Hobbs Abandonment	Reported:
Hobbs NM, 88240	Project Manager: Kristin Farris-Pope	06/07/06 10:45

#### **Organics by GC - Quality Control**

#### **Environmental Lab of Texas**

		Reporting		Spike	Source		%RÉC		RPD	
Analyte	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes

Batch	EF60219 -	Solvent	Extraction (GC)	
Daten	DI OUMI/	Southerne	LAG action (OC)	

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Matrix Spike (EF60219-MS1)	Sourc	e: 6F02008	-01	Prepared: 0	)6/02/06 A	nalyzed: 0	6/05/06			
Carbon Ranges C6-C12	734	10.0	mg/kg dry	696	ND	105	75-125			
Carbon Ranges C12-C28	728	10.0	**	696	42.5	98.5	75-125			
Total Hydrocarbon nC6-nC35	1460	10.0	н	1390	42.5	102	75-125			
Surrogate: 1-Chlorooctane	55.6		mg/kg	50.0		111	70-130			
Surrogate: 1-Chlorooctadecane	47.3		"	50.0		94.6	70-130			
Matrix Spike Dup (EF60219-MSD1)	Source: 6F02008-01		Prepared: 06/02/06 Analyzed: 06/05/06							
Carbon Ranges C6-C12	724	10.0	mg/kg dry	696	ND	104	75-125	1.37	20	
Carbon Ranges C12-C28	734	10.0	п	696	42.5	99.4	75-125	0.821	20	
Total Hydrocarbon nC6-nC35	1460	10.0	и	1390	42.5	102	75-125	0.00	20	
Surrogate: 1-Chlorooctane	55.0		mg/kg	50.0		110	70-130			
Surrogate: 1-Chlorooctadecane	46.4		"	50.0		92.8	70-130			

Environmental Lab of Texas

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Rice Operating Co. 122 W. Taylor Hobbs NM, 88240

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Project: F-33 Vent (UN0080) Project Number: Hobbs Abandonment Project Manager: Kristin Farris-Pope

# Fractionation of Aliphatics by TNRCC Method 1006 - Quality Control

#### **Environmental Lab of Texas**

	R	eporting		Spike	Source		%REC		RPD	
Analyte	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes

#### Batch EF60608 - Solvent Extraction (GC)

Blank (EF60608-BLK1)				Prepared: 06/02/06	5 Analyzed: 06	5/06/06			
 C6-C8	ND	10.0	mg/kg wet						
>C8-C10	ND	10.0	"						
>C10-C12	ND	10.0	"						
>C12-C16	ND	10.0	"						
>C16-C21	ND	10.0							
>C21-C35	ND	10.0	"						
Total Hydrocarbon nC6-nC35	ND	10.0							
LCS (EF60608-BS1)				Prepared: 06/02/06	6 Analyzed: 06	5/06/06			
Total Hydrocarbon nC6-nC35	1730	10.0	mg/kg wet	2000	86.5	60-140			
Calibration Check (EF60608-CCV1)				Prepared & Analy	zed: 06/06/06				
Total Hydrocarbon nC6-nC35	568		mg/kg	500	114	80-120			
Duplicate (EF60608-DUP1)	Source	e: 6E25001	-01	Prepared & Analy	zed: 06/06/06				
C6-C8	48.7	10.0	mg/kg dry	50.8	\$		4.22	20	
>C8-C10	415	10.0	17	421			1.44	20	
>C10-C12	891	10.0	n	892	!		0.112	20	
>C12-C16	2500	10.0	17	246	0		1.61	20	
>C16-C21	2340	10.0	"	230	0		1.72	20	
>C21-C35	1730	10.0	л	169	0		2.34	20	
Total Hydrocarbon nC6-nC35	7920	10.0	"	781	0		1.40	20	

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# Project: F-33 Vent (UN0080) Project Number: Hobbs Abandonment Project Manager: Kristin Farris-Pope

# Fractionation of Aromatics by TNRCC Method 1006 - Quality Control

### **Environmental Lab of Texas**

1										
		Reporting		Spike	Source		%REC		RPD	
	Analyte Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes

### Batch EF60608 - Solvent Extraction (GC)

Blank (EF60608-BLK1)				Prepared: 06/02/0	6 Analyzed: 00	5/06/06			
C7-C8	ND	10.0	mg/kg wet						
>C8-C10	ND	10.0	"						
>C10-C12	ND	10.0	"						
>C12-C16	ND	10.0	"						
>C16-C21	ND	10.0	"						
>C21-C35	ND	10.0	"						
Total Hydrocarbon nC6-nC35	ND	10.0	"						
LCS (EF60608-BS1)				Prepared: 06/02/0	6 Analyzed: 00	5/06/06			
Total Hydrocarbon nC6-nC35	1730	10.0	mg/kg wet	2000	86.5	60-140			
Calibration Check (EF60608-CCV1)				Prepared & Analy	/zed: 06/06/06				
Total Hydrocarbon nC6-nC35	568		mg/kg	500	114	80-120			
Duplicate (EF60608-DUP1)	Sourc	e: 6E25001	1-01	Prepared & Analy	/zed: 06/06/06				
C7-C8	6.25	10.0	mg/kg dry	6.4	4		2.99	20	J
>C8-C10	73.4	10.0	n	69.	.5		5.46	20	
>C10-C12	283	10.0	"	290	0		2.44	20	
>C12-C16	1360	10.0	н	134	10		1.48	20	
>C16-C21	1790	10.0	н	176	50		1.69	20	
>C21-C35	1680	10.0	н	167	70		0.597	20	
Total Hydrocarbon nC6-nC35	5200	10.0	ч	513	0		1.36	20	

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The results in this report apply to the samples analyzed in accordance with the samples received in the laboratory. This analytical report must be reproduced in its entirety. with written approval of Environmental Lab of Texas.

Rice Operating Co. 122 W. Taylor Hobbs NM, 88240		Pr Project Nu Project Ma	roject: F- imber: Ho nager: Kr	33 Vent (UN0 obbs Abandon istin Farris-Po	0080) iment ope				Fax: (505) Repo 06/07/0	397-14 rted: 6 10:45
General	Chemistry Para	meters by Environn	ls - Qua	lity Con	trol					
Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	No
Batch EE62607 - General Preparatio	n (Prep)									
Blank (EE62607-BLK1)				Prepared: 0	05/25/06 A	nalyzed: 05	/26/06			
% Solids	100		%							
Duplicate (EE62607-DUP1)	Sou	rce: 6E24016-	/26/06							
% Solids	96.6		%		96.8	0.207	20			
Duplicate (EE62607-DUP2)	Sou	rce: 6E24016-	-21	Prepared: 0	05/25/06 A					
% Solids	99.6		%	· · ·	99.9			0.301	20	
Duplicate (EE62607-DUP3)	Sou	rce: 6E24016-	-41	Prepared: 0	05/25/06 A	nalyzed: 05	/26/06			
% Solids	99.7		%		99.5			0.201	20	
Duplicate (EE62607-DUP4)	Sou	rce: 6E25007-	-02	Prepared: 0	)5/25/06 A	nalyzed: 05	/26/06			
% Solids	90.8		%		89.7			1.22	20	
Batch EE63005 - Water Extraction										
Blank (EE63005-BLK1)				Prepared &	: Analyzed:					
Chloride	ND	0,500	mg/kg							
LCS (EE63005-BS1)				Prepared &	: Analyzed:					
Chloride	10.2	0.500	mg/kg	10.0		102	80-120			
Calibration Check (EE63005-CCV1)				Prepared &	: Analyzed:	05/29/06				
Chłoride	10.3		mg/L	10.0		103	80-120			
Duplicate (EE63005-DUP1)	Sou	rce: 6E24016-	-41	Prepared &						
Chloride	12.2	5.00	mg/kg	······	12.8			4.80	20	

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**Reported:** 06/07/06 10:45

### General Chemistry Parameters by EPA / Standard Methods - Quality Control

### **Environmental Lab of Texas**

		Reporting		Spike	Source		%REC		RPD	
Analyte	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes
Batch EE63005 - Water Extraction										
Duplicate (EE63005-DUP2)	Sour	ce: 6E25008-	-02	Prepared &	k Analyzed:	05/29/06				
Chloride	181	20.0	mg/kg		179			1.11	20	
Matrix Spike (EE63005-MS1)	Sour	ce: 6E24016-	-41	Prepared &	epared & Analyzed: 05/29/06					
Chloride	102	5.00	mg/kg	100	12.8	89.2	80-120			
Matrix Spike (EE63005-MS2)	Sour	ce: 6E25008	-02	Prepared &	analyzed:	05/29/06				
Chloride	571	20.0	me/ke	400	179	98.0	80-120			

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Rice Operating Co. 122 W. Taylor Hobbs NM, 88240 Project: F-33 Vent (UN0080) Project Number: Hobbs Abandonment Project Manager: Kristin Farris-Pope

**Reported:** 06/07/06 10:45

# Volatile Organic Compounds by EPA Method 8260B - Quality Control

#### **Environmental Lab of Texas**

		Reporting		Spike	Source		%REC		RPD	
Analyte	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes

#### Batch EE62606 - EPA 5030C (GCMS)

Blank (EE62606-BLK1)				Prepared & Ana	ilyzed: 05/26/06	
Benzene	ND	25.0	ug/kg wet			
Toluene	ND	25.0	"			
Ethylbenzene	ND	25.0	"			
Xylene (p/m)	ND	25.0	"			
Xylene (o)	ND	25.0	"			
Naphthalene	ND	25.0	n			
Surrogute: Dibromofluoromethane	53.0		ug/l	50.0	106	70-139
Surrogate: 1.2-Dichloroethane-d4	43.7		"	50.0	87.4	52-149
Surrogate: Toluene-d8	41.3		"	50.0	82.6	76-125
Surrogate: 4-Bromofluorobenzene	37.5		"	50.0	75.0	66-145
LCS (EE62606-BS1)				Prepared & Ana	alyzed: 05/26/06	
Benzene	568	25.0	ug/kg wct	625	90.9	70-130
Toluene	589	25.0	"	625	94.2	70-130
Ethylbenzene	627	25.0	"	625	100	70-130
Xylene (p/m)	1200	25.0	"	1250	96.0	70-130
Xylene (0)	640	25.0	"	625	102	70-130
Naphthalene	534	25.0	"	625	85.4	70-130
Surrogate: Dibromofluoromethane	47.5		ug/l	50.0	95.0	70-139
Surrogate: 1,2-Dichloroethane-d4	41.7		"	50.0	83.4	52-149
Surrogate: Toluene-d8	42.8		"	50.0	85.6	76-125
Surrogate: 4-Bromofluorobenzene	40.7		"	50.0	81.4	66-145
Calibration Check (EE62606-CCV1)				Prepared & Ana	lyzed: 05/26/06	
Toluene	42.9		ug/l	50.0	85.8	70-130
Ethylbenzene	40.5		"	50.0	81.0	70-130
Surrogate: Dibromofluoromethane	50.6		"	50.0	101	70-139
Surrogate: 1,2-Dichloroethane-d4	43.9		"	50.0	87.8	52-149
Surrogate: Toluene-d8	45.7		"	50.0	91.4	76-125
Surrogate: 4-Bromofluorobenzene	43.9		"	50.0	87.8	66-145

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Rice Operating Co. 122 W. Taylor Hobbs NM, 88240

# Project: F-33 Vent (UN0080) Project Number: Hobbs Abandonment Project Manager: Kristin Farris-Pope

Fax: (505) 397-1471

**Reported:** 06/07/06 10:45

# Volatile Organic Compounds by EPA Method 8260B - Quality Control

# **Environmental Lab of Texas**

f										
		Reporting		Spike	Source		%REC		RPD	
Analyte	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes

#### Batch EE62606 - EPA 5030C (GCMS)

Matrix Spike (EE62606-MS1)	Source	e: 6E25028	-02	Prepared &	Analyzed:	05/26/06				
Benzene	642	25.0	ug/kg dry	666	ND	96.4	70-130			
Toluene	670	25.0	"	666	ND	101	70-130			
Ethylbenzene	699	25.0	n	666	ND	105	70-130			
Xylene (p/m)	1330	25.0	"	1330	ND	100	70-130			
Xylene (0)	713	25.0	"	666	ND	107	70-130			
Naphthalene	547	25.0	**	666	32.7	77.2	70-130			
Surrogate: Dibromofluoromethane	46.8		ug/l	50.0		93.6	70-139			
Surrogate: 1,2-Dichloroethane-d4	41.6		"	50.0		83.2	52-149			
Surrogate: Toluene-d8	41.1		"	50.0		82.2	76-125			
Surrogate: 4-Bromofluorobenzene	39.4		"	50.0		78.8	66-145			
Matrix Spike Dup (EE62606-MSD1)	Source	e: 6E25028	-02	Prepared &	Analyzed:	05/26/06				
Benzene	631	25.0	ug/kg dry	666	ND	94.7	70-130	1.78	20	
Toluene	655	25.0	"	666	ND	98.3	70-130	2.71	20	
Ethylbenzene	613	25.0	н	666	ND	92.0	70-130	13.2	20	
Xylene (p/m)	1220	25.0	н	1330	ND	91.7	70-130	8.66	20	
Xylene (o)	654	25.0	H	666	ND	98.2	70-130	8.58	20	
Naphthalene	628	25.0	м	666	32.7	89.4	70-130	14.6	20	
Surrogate: Dibromofluoromethane	49.8		ug/l	50.0		99.6	70-139			
Surrogate: 1,2-Dichloroethane-d4	48.8 " 50			50.0		97.6	52-149			
Surrogate: Toluene-d8	42.7 " 50.0			50.0		85.4	76-125			
Surrogate: 4-Bromofluorobenzene	39.8		"	50.0		79.6	66-145			

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Page 20 of 21

Rice Ope 122 W. T Hobbs N	rating Co. 'aylor M, 88240	Project: F-33 Vent (UN0080) Project Number: Hobbs Abandonment Project Manager: Kristin Farris-Pope	Fax: (505) 397-147 Reported: 06/07/06 10:45								
<b>Notes and Definitions</b> S-06 The recovery of this surrogate is outside control limits due to sample dilution required from high analyte concentration and/or											
S-06	The recovery of this surrogate is out matrix interference's.	tside control limits due to sample dilution required from high analyte concent	ration and/or								
J	Detected but below the Reporting L	imit; therefore, result is an estimated concentration (CLP J-Flag).									
DET	ET Analyte DETECTED at or above the reporting limit										
ND	T       Analyte DETECTED         D       Analyte NOT DETECTED at or above the reporting limit         R       Not Reported										
NR											
dry	Sample results reported on a dry weight	basis									
RPD	Relative Percent Difference										
LCS	Laboratory Control Spike										
MS	MS Matrix Spike										
Dup Duplicate											

Report Approved By:

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6/7/2006

Raland K. Tuttle, Lab Manager Celey D. Keene, Lab Director, Org. Tech Director Peggy Allen, QA Officer Jeanne Mc Murrey, Inorg. Tech Director LaTasha Cornish, Chemist Sandra Sanchez, Lab Tech.

Date:

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If you have received this material in error, please notify us immediately at 432-563-1800.

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# R. T. HICKS CONSULTANTS, LTD.

1909 Brunson Ave 🔺 Midland TX 79701 🔺 432.638.8740 🔺 Fax: 413.403.9968

CERTIFIED MAIL - RETURN RECIEPT NO. 7099 3400 0017 1737 2367

January 20, 2006

Mr. Wayne Price New Mexico Oil Conservation Division 1220 South St. Francis Drive Santa Fe, New Mexico 87505

# RE: Investigation Characterization Plan: T18S R38E: E-33-1 Junction Box, B-32 Boot, E-32-1 Junction Box, E-32-2 Junction Box, F-33 Vent

# Hobbs Salt Water Disposal System

Dear Mr. Price:

On behalf of Rice Operating Company, please accept this submission as our Initial Characterization Plan (ICP) for the five (5) sites referenced above within the Hobbs Salt Water Disposal System (Plate 1).

Rice Operating Company (ROC) is the service provider (operator) for the Hobbs Saltwater Disposal System and has no ownership of any portion of pipeline, well, or facility. A consortium of oil producers who own the Hobbs System (System Partners); provide all operating capital on a percentage ownership/usage basis. Major projects require System Partner authorization for expenditures (AFE) approval and work begins as funds are received. We will implement the work outlined herein after NMOCD approval and subsequent authorization from the System Partners.

For all environmental projects, ROC will choose a path forward that:

- 1. protects public health,
- 2. provides the greatest net environmental benefit,
- 3. complies with NMOCD Rules, and
- 4. is supported by good science.

The last criteria employed when evaluating any proposed remedy or investigative work is confirming that there is a reasonable relationship between the benefits created by the proposed remedy or assessment and the economic and social costs.

Each site shall have three submissions or a combination of:

- 1. This <u>Investigation and Characterization Plan</u> (ICP) is a proposal for data gathering and site characterization and assessment.
- 2. Upon evaluation of the data and results from the ICP, a recommended remedy will be submitted in a <u>Corrective Action Plan</u> (CAP).
- 3. Finally, after implementing the remedy, a <u>closure report</u> with final documentation will be submitted.

January 20, 2006 Page 2

# Task 1 Evaluate Chloride and BTEXN Concentrations in Soil at Five Sites, Evaluate Ground Water Quality if Necessary

We will follow the same protocol for characterization of the unsaturated zone at the five new ROC sites listed below.

- o E-33-1 Junction Box
- o B-32 Boot
- o E-32-1 Junction Box
- E-32-2 Junction Box
- o F-33 Vent

At each of the above-referenced sites, we will locate the sampling borehole as close as practical to the suspected release source. Earlier, we inspected each of the five sites nominated in this ICP and identified the boring location before the sites were backfilled and re-graded. Due to our recent experience with difficulties encountered in the installation of well clusters in this area, we plan to employ hollow-stem auger drilling techniques for sampling.

We will screen each sample in the field for chlorides and volatile organic compounds using the methods described in QP-03 and QP-07 (attached), respectively. Soil lithology and the presence of any observed staining or odor will be recorded. For any site, if we detect evidence of leakage within 15 feet of the water table (e.g. field chloride greater than 250 ppm in soil samples) we will complete the boring as a monitoring well in accordance with NMOCD Guidance. If three soil samples taken at 5-foot intervals test below 250 ppm chloride and below 100 ppm total volatile organic compounds, we will terminate the boring. However, all borings will penetrate at least 30 feet of the vadose zone.

# Task 2 Evaluate Chloride and Hydrocarbon Flux from the Vadose Zone to Ground Water

We anticipate that one or all of the five sites selected for borehole investigation will show evidence of seepage from the source to a depth of more than 15-feet. For these sites, excavation and disposal of released material can cause more environmental damage than it cures. For such sites, we propose to employ HYDRUS-1D and a simple ground water mixing model to evaluate the potential of any residual chloride and hydrocarbon mass in the vadose zone to impair ground water quality above WQCC Standards. We have selected these two constituents for simulation modeling because each of these constituents is typically found in produced water and each is specifically regulated by New Mexico ground water regulations (WQCC). We will also employ vadose zone hydrocarbon migration predictive tools commonly employed by NMED in their PST program.

# Task 3 Provide Investigative Results and/or Corrective Action Plan

Because the Hobbs SWD System no longer carries produced water, additional releases of produced water to ground water are highly unlikely. If modeling shows that the residual chloride and hydrocarbon mass in the vadose zone poses a no threat to ground water quality, we will prepare a report that makes this demonstration and request site closure.

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If simulation experiments suggest that residual constituents pose a threat to ground water quality or if the field program demonstrates impairment, we will expand upon the HYDRUS-1D model predictions described above to develop a remedy for the vadose zone. If necessary, we will simulate:

- 1. Excavation, disposal and replacement of clean soil to remove the chloride and hydrocarbon mass,
- 2. Installation of a low permeability barrier to minimize natural infiltration,
- 3. Surface grading and seeding to eliminate any ponding of precipitation and promote evapotranspiration, thereby minimizing natural infiltration, and
- 4. A combination of the above potential remedies.

We will select the vadose zone remedy that offers the greatest environmental benefit while causing the least environmental damage. If data suggest that the site has contributed chloride or hydrocarbons to ground water and caused ground water impairment, we will notify NMOCD and work collaboratively to determine the appropriate path forward.

### **Proposed Schedule**

With NMOCD's approval of this work plan, we can perform the field activities at these sites in February or March. In late April or May, we plan to deliver any individual Correction Action Plans to address residual constituents in the vadose zone and any reports requesting site closure. If data suggest ground water impairment we plan to conduct two quarters of ground water monitoring to confirm any initial result then meet with NMOCD to develop an appropriate path forward. Your approval to move forward with this work plan will facilitate approval of expenditures by the System Partners.

Sincerely, R.T. Hicks Consultants, Ltd.

Libert J. Van Deventer

Gilbert Van Deventer Project Manager

cc: Chris Williams, NMOCD Hobbs District Office Carolyn Haynes, Rice Operating Company - Hobbs Kristin Pope, Rice Operating Company – Hobbs Randy Hicks, R. T. Hicks Consultants, Ltd. - Albuquerque



**Rice Operating Company** 

#### **QUALITY PROCEDURE**

Sampling and Testing Protocol Chloride Titration Using 282 Normal Silver Nitrate Solution

#### 1.0 Purpose

This procedure is to be used to determine the concentration of chloride in soil.

#### 2.0 Scope

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This procedure is to be used as the standard field measurement for soil chloride concentrations.

### 3.0 Sample Collection and Preparation

- 3.1 Collect at least 80 grams of soil from the sample collection point. Take care to insure that the sample is representative of the general background to include visible concentrations of hydrocarbons and soil types. If necessary, prepare a composite sample for soils obtained at several points in the sample area. Take care to insure that no loose vegetation, rocks or liquids are included in the sample(s).
- 3.2 The soil sample(s) shall be immediately inserted into a one-quart or larger polyethylene freezer bag. Care should be taken to insure that no crosscontamination occurs between the soil sample and the collection tools or sample processing equipment.
- 3.3 The sealed sample bag should be massaged to break up any clods.

#### 4.0 Sample Preparation

- 4.1 Tare a clean glass vial having a minimum 40 ml capacity. Add at least 10 grams of the soil sample and record the weight.
- 4.2 Add at least 10 grams of reverse osmosis water to the soil sample and shake for 20 seconds.
- 4.3 Allow the sample to set for a period of 5 minutes or until the separation of soil and water.
- 4.4 Carefully pour the free liquid extract from the sample through a paper filter into a clean plastic cup if necessary.

#### 5.0 Titration Procedure

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- 5.1 Using a graduated pipette, remove 10 ml extract and dispense into a clean plastic cup.
- 5.2 Add 2-3 drops potassium chromate (K2CrO4) to mixture.
- 5.3 If the sample contains any sulfides (hydrogen or iron sulfides are common to oilfield soil samples) add 2-3 drops of hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>) to mixture.
- 5.4 Using a 1 ml pipette, carefully add .282 normal silver nitrate (one drop at a time) to the sample while constantly agitating it. Stop adding silver nitrate when the solution begins to change from yellow to red. Be consistent with endpoint recognition.
- 5.5 Record the ml of silver nitrate used.
- 6.0 Calculation

To obtain the chloride concentration, insert measured data into the following formula:

282 X 35.450 X ml AgNO3	Х	grams of water in mixture
ml water extract		grams of soil in mixture

Using Step 5.0, determine the chloride concentration of the RO water used to mix with the soil sample. Record this concentration and subtract it from the formula results to find the net chloride in the soil sample.

Record all results on the delineation form.

# **Rice Operating Company**

# QUALITY PROCEDURE Sampling and Testing Protocol for VOC in Soil

#### 1.0 Purpose

This procedure is to be used to determine the concentrations of Volatile Organic Compounds in soils.

#### 2.0 Scope

This procedure is to be used as the standard field measurement for soil VOC concentrations. It is not to be used as a substitute for full spectrographic speciation of organic compounds.

### 3.0 Procedure

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- 3.1 Sample Collection and Preparation
  - 3.1.1 Collect at least 500 g. of soil from the sample collection point. Take care to insure that the sample is representative of the general background to include visible concentrations of hydrocarbons and soil types. If necessary, prepare a composite sample of soils obtained at several points in the sample area. Take care to insure that no loose vegetation, rocks or liquids are included in the sample(s).
  - 3.1.2 The soil sample(s) shall be immediately inserted into a one-quart or larger polyethylene freezer bag and sealed. When sealed, the bag should contain a nearly equal space between the soil sample and trapped air. Record the sample name and the time that the sample was collected on the Field Analytical Report Form.

3.1.3 The sealed samples shall be allowed to set for a minimum of five minutes at a temperature of between 10-15 Celsius,  $(59-77^{\circ}F)$ . The sample temperatures may be adjusted by cooling the sample in ice, or by heating the sample within a generally controlled environment such as the inside of a vehicle. The samples should not be placed directly on heated surfaces or placed in direct heat sources such as lamps or heater vents.

3.1.4 The sealed sample bag should be massaged to break up any clods, and to provide the soil sample with as much exposed surface area as practically possible.

QP-07

#### 3.2 Sampling Procedure

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3.2.1 The instrument to be used in conducting VOC concentration testing shall be an Environmental Instruments 13471 OVM / Datalogger or a similar PID-type instrument. (Device will be identified on VOC Field Test Report Form.) Prior to use, the instrument shall be zeroed-out in accordance with the appropriate maintenance and calibration procedure outlined in the instrument operation manual. The PID

3.2.2 Carefully open one end of the collection bag and insert the probe tip into the bag taking care that the probe tip not touch the soil sample or the sidewalls of the bag.

device will be calibrated each day it's used.

- 3.2.3 Set the instrument to retain the highest result reading value. Record the reading onto the Field Test Report Form.
- 3.2.4 If the instrument provides a reading exceeding 100 ppm, proceed to conduct BTEX Speciation in accordance with QP-02 and QP-06. If the reading is 100 ppm or less, NMOCD BTEX guideline has been met and no further testing for BTEX is necessary. File the Field Test Report Form in the project file.
- 4.0 Clean-up

After testing, the soil samples shall be returned to the sampling location, and the bags collected for off-site disposal. IN NO CASE SHALL THE SAME BAG BE USED TWICE. EACH SAMPLE CONTAINER MUST BE DISCARDED AFTER EACH USE.